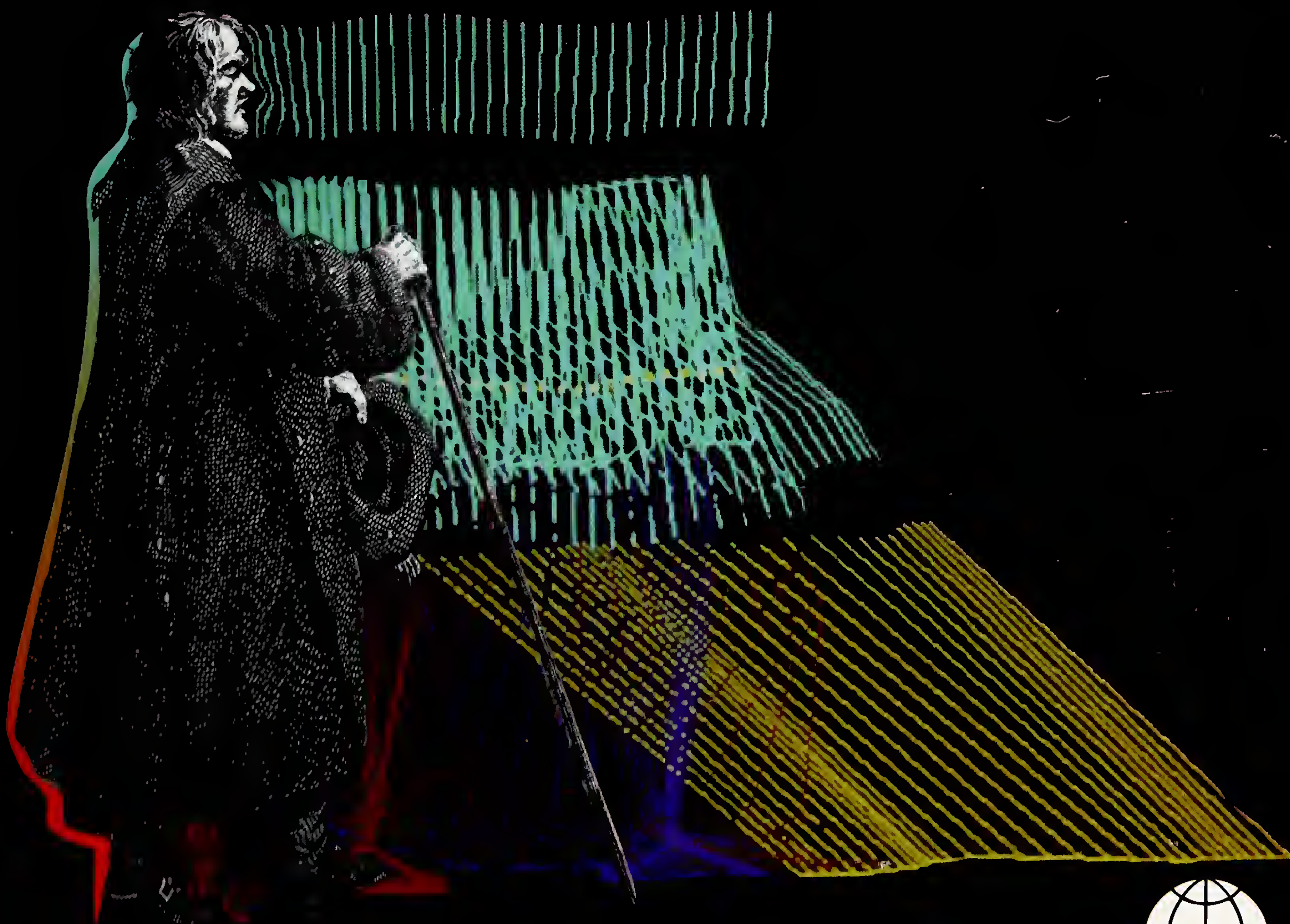
The 9th International Mobility Conference Proceedings



The 9th International Mobility Conference

IMC9

Atlanta, Georgia USA - July 1-6, 1998

Conference Proceedings

The 9th International Mobility Conference

O&M Moving into the Twenty-First Century

Atlanta, Georgia USA
July 1 – 6, 1998

Edited by: Eileen Siffermann, Michael Williams, and Bruce B. Blasch

Rehabilitation Research & Development Center
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Rehabilitation Research and Development Center (151R)
Atlanta VA Medical Center
1670 Clairmont Road
Decatur, GA 30033
USA
BEARconsul@AOL.com

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PREFACE

BRUCE B. BLASCH AND EILEEN SIFFERMANN

The International Mobility Conference (IMC) is an independent group of practitioners in mobility of the visually impaired consisting of mobility instructors and mobility centers. Its aim is furthering the level of expertise of mobility instructors through an international exchange of ideas and information. The Conference is designed to be a forum for participants, a focus for innovation and a source of ideas for service development. IMC started in 1979 in Frankfurt, Germany. Subsequent conferences were held in Paris, France (1981), Vienna, Austria (1983), Jerusalem, Israel (1986), Veldhoven, The Netherlands (1989), Madrid, Spain (1991), Melbourne, Australia (1994) and Trondheim, Norway (1996).

The 9th IMC was hosted by the Rehabilitation Research and Development Center, Atlanta VA Medical Center and was sponsored by the US Department of Veterans Affairs and The Seeing Eye Inc.

IMC 9 consist of three pre-conference seminars held July 1 and 2, 1998. The seminar on O&M Research was coordinated by Duane Geruschat and William De l'Aune. The seminar on Needs and Basic Skills in O&M addressing O&M in developing areas of the world was coordinated by William Jacobson. The seminar on Education of O&M Instructors was coordinated by William Wiener and Sandra Rosen. The IMC Main Conference was held July 3 – 6, 1998. Richard L. Welsh, host of the General Sessions, served on the program committee and contributed to the selection of papers and posters for the Main Conference.

These Conference Proceedings have been compiled from the material submitted by featured speakers; presenters of papers and posters; and printed as received by the authors. The Proceedings are organized by date of presentation. A table of contents and author index is included.

Our sincere thanks to the hundreds of people for their contributions to IMC 9.

INTRODUCTION TO THE PRE-CONFERENCE SEMINAR OF THE 9TH INTERNATIONAL MOBILITY CONFERENCE ON RESEARCH

JON S. PETERS,
Director, Baltimore Rehabilitation Information
and Technology Administrative Center
Department of Veterans Affairs
103 S. Gay Street
Baltimore, Maryland 21202

It is indeed a pleasure to welcome you to the Pre-Conference Seminar of the 9th International Mobility Conference on Research. For those of you who are visiting our country, I would also like to extend a welcome to the United States and to Atlanta, Georgia. The Department of Veterans Affairs is particularly pleased to be the Host and co-sponsor of IMC 9 for many reasons. First, the Department of Veterans Affairs or VA has always tried to provide the best possible services to our nations veterans. Secondly, in regards to the preconference seminar on research, the VA has been and we think continues to be a leader in the area of rehabilitation research for individuals who are visually impaired. I would like to take a few moments to give you a brief perspective of this VA involvement and work that has been done in the area of visual impairment and blindness. My remarks are not intended to be all inclusive but to draw your attention to some of the significant highlights.

Prior to the early part of the twentieth century, blind persons who were employed in the United States worked in sheltered workshops. Extending vocational education to disabled persons gained considerable impetus during World War I. At that time many believed that vocational training would help individuals with a disability develop skills needed for vocational effectiveness. Vocational rehabilitation was first viewed as a critical need for veterans when they returned from World War I.

The War Risk Insurance Act of 1914 was a landmark legislation that authorized vocational rehabilitation services for all veterans disabled during the war, with employment as a real possibility after vocational rehabilitation training (Koestler, 1976). It was during the early history of organized labor that the need for vocational education programs was realized. Large numbers of unskilled laborers needed vocational training and retraining when skills they had for a particular task became obsolete.

The War Risk Insurance Act was superseded in 1918 by the Smith-Hughes Vocational Education Act. It created a Federal Board for Vocational Education to administer the task of providing vocational training for all war-disabled men as well as civilian vocational rehabilitation programs.

World War II resulted in considerable growth in the development of rehabilitation services in general and the rehabilitation of blind persons most specifically. The wartime labor shortage gave disabled persons a major opportunity to demonstrate to employers that a disability did not mean that a disabled employee could not be successful. It was also during this time that the techniques in using the long cane were developed. We are extremely fortunate to have Mr. Russell Williams and Mr. Stanley Suterko as some of those originators of orientation and mobility as featured speakers at the IMC 9 Main Conference. They will be addressing the development of O&M in much more detail and from first hand experience.

Another area of research emphasis has been in the area of technology development and evaluation. The VA Prosthetics and Sensory Aids Research Service (PSAS) operating out of the 7th Avenue VA in New York City originally coordinated the evaluation of sensory aids. Researchers were deployed in each of the Blind Rehabilitation Centers to conduct centrally coordinated studies on emerging technology for the blind. This strategy led to significant progress in electronic travel aids (Laser Cane, Binaural Sensory Aid, Pathsounder), communication technology (Stereotoner, Optacon, text to speech synthesis, speech compression), and low vision aids (optical devices, closed circuit television systems, Fresnel prisms) in the 1960s and early 70s.

Technology evaluations that assessed clinical performance with a technology and attempted to link that performance to client characteristics were conducted under the auspices of Prosthetics and Sensory Aids Service (PSAS) of the Veterans Administration in the 1970s. PSAS sponsored studies included evaluations of field expansion devices (Finn et al, 1974; Gadbaw et al, 1976), Optacon use (Gadbaw et al, 1977), and speech compression use (De l'Aune, 1977). Multi site evaluations of rehabilitation technology taking a general look at mobility devices and reading machines (De l'Aune and Gadbaw, 1979) or specific examinations of the OCR rate of Kurzweil Reading Machines (Goodrich et al, 1980) were also undertaken under PSAS auspices.

When Rehabilitation Research and Development Service was reorganized in the mid-70's, a Rehabilitation Evaluation Unit was established in Baltimore to assume this function but in a much less structured way. Since the demise of PSAS, evaluation of rehabilitation technology for the visually impaired has continued, but has been primarily focused on follow-up surveys of device use. There have been two large-scale surveys of technology use by individuals with visually impairment. Blasch et al (1989) of the Rehab R&D Center in Atlanta conducted a national survey of electronic travel aid use. The results from 298 respondents indicated that the Laser Cane continued to be used on an intermittent basis by 78% of those trained. Watson et al (1997a, 1997b), also of the Atlanta Rehab R&D Center, provided information concerning veterans use of low vision devices. Their results indicated that 99% of the 200 veterans surveyed were using at least one of their prescribed devices and that over 80% of the pre-

scribed devices were still in use one to two years after issuance. While these retrospective studies have provided the rehabilitation community with extraordinarily valuable information concerning device utilization, they have provided less data on crucial outcome issues such as quality of life changes, cost effectiveness, and issuance criteria (also known as critical pathways or practice guidelines).

Individual VA researchers have been supported by VA Rehab R&D and have accomplished pioneering work in the development and evaluation of innovative technology in many other projects. This includes Rehab R&D merit review funded projects on developing a criteria for task safety in mobility (C585RA), study of factors leading to disuse of low vision devices (C814RA), development and evaluation of an electrolurninescent aid for low vision readers (B91-255AP), redesign of the Laser Cane (C673RC), evaluation of a peripheral vision expander system (C92-466AP), design and evaluation of liquid crystal dark-adapting eyeglasses (C776-RA), design and evaluation of an adaptive cane for special populations (C94-482AP), development of a system to assess mobility over long distances (C93-601AP), design and evaluation of adjustable power liquid crystal lenses (C93-608AP), and evaluation of illumination sources for individuals with low vision (C815RA). The DVA study C97-2179-RA, "Outcome Assessment of the Rehabilitation of the Visually Impaired," is in the process of gathering data on all veterans enrolled in the residential blind rehabilitation programs in the VA (approximately 1,400 per year) and from an analogous number of individuals undergoing rehabilitation in non- VA programs.

As described above, the early emphasis and research was on the rehabilitation process of younger veterans to obtain gainful employment. The VA Blind Rehabilitation Centers has always provided service to veterans of all ages as well as veterans who did not have a service connected disability such as blindness due to diabetes. Even today this level of research interest has continued. however the research emphasis is now on the elderly visually impaired individual since the average age of veterans receiving rehabilitation services today is 67 years old (De l'Aune, 1998). The VA also operates long-term care facilities and adult day care programs for frail elderly veterans. The VA has been responsible for the development of many prosthetics, orthitics, devices and rehabilitation techniques including the systematic use of the long (white) cane for independent mobility but there is much more that needs to be done. It has been estimated that the Department of Veterans Affairs funds more research in the area of rehabilitation of visually impaired individuals than any other US Federal Agency. It is therefore with great interest that I look forward to the sharing of research over the next two days of this seminar and the exchange of program information at the IMC 9 meetings. It is only through meetings like this one, where we can all share our knowledge and experience, that we can improve the services we provide to individuals with a visual impairment.

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AUDITORY INFORMATION FOR MOBILITY

DANIEL H. ASHMEAD, ROBERT S. WALL, SUSAN B. EATON
Department of Hearing & Speech Sciences
Vanderbilt University Medical Center
Nashville, TN 37232-9700
U.S.A.

During the past several years our research has focused on the role of visual experience in the development of auditory space perception and the use of auditory information for guidance of locomotion. In findings presented at IMC-8, we reported that early visual experience is not necessary for the development of excellent auditory space perception, and that the ambient sound field in a room provides critical information about the locations of walls. In the current presentation we describe two specific travel situations in which auditory information is critical. First is the situation just mentioned, walking parallel to wall surfaces by perceiving the buildup of low frequency sound near the wall. The acoustics of this situation will be described, and our experimental work will be summarized, showing that children with visual disabilities are sensitive to binaural auditory information that specifies the locations of walls. The second situation we have been working on is the auditory information used by pedestrians to support correct alignment when crossing streets. We describe the two principal cues that seem useful in this situation and present experimental findings on sighted adults' sensitivity to the information. The overall purpose of our work is to analyze the specific auditory information that supports critical day-to-day tasks in orientation and mobility, with the intent of facilitating instructional methods.

The ability to detect features such as walls via hearing is frequently called "echolocation". This is a misleading term because it implies a sonar-like range finding process that humans have not been shown to possess. We investigated the possibility that people are sensitive to the buildup of very low frequency sound near walls. In other words, the structure of the ambient sound field has fluctuations that specify the locations of walls, even in a "quiet" room. This buildup effect is predicted from theoretical acoustics and it can be measured in typical indoor settings. In a series of experiments, we found that children with visual disabilities can use this auditory information to walk straight along hallways without touching the walls. Moreover, this ability is based to a large extent on binaural comparison of the sound coming to the two ears. This makes sense because as one veers toward a wall, the buildup of sound reaches the wall-side ear more so than the other ear. This emphasis on the structure of the ambient sound field in the low frequency range is consistent with other recent findings on auditory detection of architectural features.

O&M instructors teach travelers to utilize the sound from traffic flow for maintaining a parallel line of travel and for alignment during street crossings. The critical auditory information for this skill probably consists of the fairly constant directions of vehicles when they are far from the traveler, and the dynamic change in direction and intensity when a vehicle passes at its closest point of approach. Working in real everyday traffic situations, we replicated previous find-

ings that alignment errors are in the range of 5 to 15 degrees, for both parallel and perpendicular alignment. In order to explore the perceptual processes contributing to this listening skill, we made special recordings of a moving sound source as it passed by a manikin equipped with ears through which audio recordings are made. When played back through appropriate earphones, these signals result in a fairly realistic three-dimensional impression of the original sounds. In one experiment, we played signals recorded with the manikin having different amounts of alignment error, where the task was to say whether the misalignment was to the left or right. The threshold for correctly reporting the alignment error was about 8 degrees, which is consistent with the alignment errors found in real traffic situations. This suggests that there is a very real perceptual limitation to the traffic alignment task. Our ongoing work is directed at identifying those portions of a vehicle's travel path which are most useful for the listener. Because the signals are computer generated, we can "clip" our selected portions of the path. Preliminary findings indicate that the "appearance" or early portion of the path is less useful than the "closest approach" and "disappearance" portions of the path. Listeners are faced with a paucity of good auditory information in this travel situation. When a vehicle is far enough away so that its direction remains fairly constant, the sound from tire and engine noise is usually faint. When the vehicle is passing by at closest approach, the direction is changing more rapidly than the auditory system can keep track of well. Considering these difficulties, it is not surprising that this aspect of O&M training requires substantial experience.

AUDITORY THRESHOLDS NECESSARY TO CROSS STREETS

Abstracted from Wiener, Lawson, Naghshineh, Brown, Bischoff and Toth (1997). The Use of traffic sounds to Make Street Crossings by Persons Who Are Visually Impaired. Journal of Visual Impairment and Blindness. (91) 5, p. 435-445.

A major concern of the orientation and mobility specialist is how well a person who is visually impaired is able to interpret traffic sounds to cross the street safely in both residential and business areas. The functionally blind traveler must depend almost entirely upon traffic sounds to make accurate and safe crossings. The low vision traveler often will hear the sounds of an approaching car before it is seen, and therefore will also depend heavily upon the sound of traffic. Individuals who are both visually and hearing impaired are at a disadvantage when determining when to make street crossings. Reduced sensitivity to sound may prevent the traveler from detecting the presence of an approaching car or may interfere with the ability to identify the traffic surge that is used to determine when to make a crossing. Study of the auditory thresholds necessary to cross streets will become even more important as society moves into an era of quiet electric vehicles. It is the purpose of this study to analyze traffic sounds and explore their use by persons who are visually impaired including those who are also hearing impaired.

Traffic Sounds

The sound generated by vehicles is an important source of information for the visually impaired traveler. Vehicular noises are many but can be classified into two main groups: engine noise and rolling noise (Crepeau, 1978; Hothersall, 1977). Engine related noise is comprised of sound emitted from the engine, the exhaust, the carburetor, and the cooling fan. For most automobiles traveling at speeds under 35 miles per hour, engine related noise is the predominant source of traffic sound. During the acceleration of a vehicle, noise produced by the engine-related sources tends to increase by approximately IO dB over that of driving at a constant speed (Vergers, 1987). Rolling noise can be attributed to movement of the tires over the road, wind noise and vibration. Measurements indicate that tire noise generates sound which covers the entire audible frequency range from 20 to 20,000 Hz. At high speeds, tire noise becomes a major noise contributor. With each doubling of speed the tire noise increases by about 9 dB (Nelson 1987).

Purpose of the Study

Orientation and mobility specialists must be able to determine whether a student has adequate hearing to interpret traffic sounds. Audiometric data is typically used to predict the student's communication ability. Another important use of this information is to estimate the student's potential for using traffic sounds in independent travel. The ability to use auditory cues will help determine how successful a traveler can become. It is, therefore, important to understand the auditory thresholds of the traveler and the nature and audibility of traffic sounds.

METHOD

A study of traffic sounds was conducted to examine the level of sound energy available in various frequencies bands. Data were gathered in a residential area and in a business area as cars accelerated from a stop at an intersection and in a residential area as vehicles approached from a distance. Traffic output was recorded on a Sony TCD-D7 Digital Audio Tape (DAT) recorder coupled to a Larson-Davis 800B sound level meter. The tapes were analyzed with a Hewlett Packard two-channel Dynamic Signal Analyzer (HP 35670A) to determine intensity in each octave band (I 6 Hz to 8 000 Hz). All recordings were made on a dry day with little wind present at a location where a pedestrian would stand if wanting to cross the street.

Sound Levels for Vehicles Accelerating from a Stop

The first part of the study measured the average intensity of traffic sounds in situations where vehicles were accelerating at residential and small business intersections. In the residential area 40 recordings were made as various single vehicles accelerated from a stop sign. In the small business area 40 recordings were made as groups of vehicles in multiple lanes accelerated from a traffic light. Twenty of the 40 recordings in the small business area were made on a two way street with a total of four lanes of traffic, and the other twenty measurements were made on a street with four lanes of traffic all moving in one direction. Octave band levels were determined for sound generated during the first 5 seconds of vehicle acceleration. Five seconds was an estimation of the time necessary for a person to determine if a vehicle was going straight through an intersection or turning.

Sound Levels for Vehicles Approaching from a Distance

The authors gathered further information to determine the intensity that may be needed to detect an oncoming vehicle when approaching a stop sign controlled intersection in a residential neighborhood. Recordings were made at times when traffic perpendicular to the direction of travel was approaching from a distance of 110feet and when parallel traffic was absent. Measurements were made for 24 individual vehicles as they crossed a point 110 feet from the comer. This distance was chosen because the American Automobile Association (1957) indicates that a car traveling 30 mph requires 78 ft to stop including 33 ft of reaction distance and 45 ft of braking distance, under clear conditions. To provide a safety margin and to allow for a car going faster than 3 0 mph, the distance of 110 feet was chosen to assure that a pedestrian could hear the car from a far enough distance to avoid injury.

RESULTS

It was found that for 40 cars in the residential setting intensity ranged from 77.8 dB SPL to 90.4 dB SPL with a mean of 86 dB SPL. In the small business setting the intensity of two-way traffic accelerating from the traffic light intensity ranged from 88.8 dB SPL to 102.4 dB SPL with a mean of 94 dB SPL. In the small business setting with four lanes of one-way traffic intensity ranged from 80.6 dB SPL to 103.5 dB SPL with a mean of 88 dB SPL. The greater intensity on the two-way street in the small business area can be explained by the double acceleration of traffic from the same light during the 5-second period. As one group of cars left the intersection from the side of the light nearest to the microphone, the second group of cars on the far side of the light accelerated from the other direction. For vehicles approaching a stop sign from a distance of 110 feet in the residential area, it was found that traffic intensity levels for

individual vehicles ranged from 70.0 dB SPL to 83.1 dB SPL with a mean of 74.4 dB SPL. According to octave band levels, most of the energy in the traffic sounds was concentrated in the low frequencies. Overall levels of the traffic noise were at least IO dB greater than the noise levels in the absence of traffic indicating that noise levels from sources other than traffic were inconsequential in the measurements.

In order to estimate the amount of traffic noise that is audible to a normal listener the octave band levels must be compared to minimum audible field values. Minimum audible field values (db SPL) in Tables 1-4 (see referenced article above) represent pure tone levels that are just audible to the average normal hearing listener in a standard test environment. These minimum audible field values represent correction factors which can be subtracted from the minimum octave band measures to estimate the audiometric hearing level (HL) needed to hear the traffic noise present in each octave band. In Tables 1-4 minimum audible field values are subtracted from the minimum octave band noise levels to estimate noise hearing levels (HQ that can be compared with hearing thresholds on the audiograin. If estimated hearing levels for noise are numerically greater than the pure tone thresholds on an individual's audiogram, the traffic sound in that frequency range should be audible. It is important to note that the threshold of audibility should in most instances be better for noise than for pure tones. However, Tables 1-4 compare octave band noise levels to thresholds of audibility for tones in a standard (quiet) test environment rather than a traffic environment. Therefore, the audibility of the noise may vary depending upon the environment.

DISCUSSION

The greatest amount of intensity in traffic noise can be found in the lowest frequency bands (32, 63, 125, and 250 Hz). However, upon consulting the minimum audible field values, it can be seen that the ear is less sensitive to low frequencies than to frequencies in the 500 Hz to 4000 Hz range. This means that audiometic thresholds in the 500 Hz to 4000 Hz range may be particularly important in assessing one's ability to detect the start of a traffic surge or the approach of a vehicle when standing at a street comer. It must also be remembered that many individuals who are seen by the orientation and mobility specialist will be wearing hearing aids that augment frequencies in this range.

From Tables 1-4 it is possible to generalize about the auditory thresholds (dB HL) needed to detect moving vehicles. Generally speaking, hearing impaired individuals who have threshold averages of 55 dB HL or better in the 500 Hz to 4000 Hz range may be able to detect the acceleration of vehicles from a stop in a residential area. Threshold averages of 65 dB HL or better may be needed to detect acceleration of vehicles in a business area. Detection of a vehicle approaching from the distance of I IO feet in a residential area should require thresholds 45 dB HL or better in the 500 Hz to 4000 Hz range. Some individuals with severe hearing loss at 500 Hz and above may be able to utilize the lower frequencies for traffic identification. Because the auditory system is less sensitive to low frequencies, the hearing thresholds at 125 Hz and 250 Hz must be considerably better than thresholds for the higher frequencies if traffic noise is to be utilized. While these generalizations may apply to most individuals, it is best to consult the traveler's audiograin to evaluate frequency specific thresholds. Even when frequency specific data are considered, determinations from individual audiograms represent

only rough estimates. Although they may provide a good starting point for evaluation, they must be accompanied by clinical trial in the travel environment.

TALKING SIGNS® AT INTERSECTIONS

BILLIE LOUISE BENTZEN, PH.D.,* LINDA MYERS, M.ED.,
AND WILLIAM CRANDALL, PH.D.
Accessible Design for the Blind
P.O. Box 1212, Berlin, MA 01503, USA

The increasing complexity of intersection geometries and traffic control systems make it increasingly difficult for pedestrians who are blind to cross streets safely and independently. However, most blind pedestrians are able to cross most streets safely and independently if they have access to the information which is provided to pedestrians who are fully sighted.

Intersection information normally available to sighted pedestrians in the visible environment includes the names of the intersecting streets, the shape of the intersection (including the general configuration, the width of the street, the number of streets that intersect, the location and direction of the crosswalk, the precise direction of the destination curb, and the presence of islands or medians), the nature of traffic control (including whether the intersection is signalized or not, whether pedestrian actuation of a walk interval is required, the location of the pedestrian push button, which street is controlled by the push button, whether there is an additional push button on an island or median, and whether the walk interval corresponds with the onset of parallel traffic), and when it is safe to begin crossing the street. Talking Signs is a technology that can make this information available to pedestrians who are visually impaired.

Talking Signs remote infrared signage technology has been under development and testing at The Smith-Kettlewell Eye Research Institute for the past twelve years. The Talking Signs system is comprised of infrared transmitters which convey speech messages to small receivers carried by blind travelers. Infrared transmission is directional. This means that when blind Talking Signs users pick up a message, they can also tell where it comes from. The message is coming from the direction in which they are pointing when they hear the message clearly. These repeating, directionally selective voice messages are transmitted by infrared light (940 nm, 25KHz). The directional selectivity is a characteristic of the light message beam; the clarity of the message increases as the sign is "pointed at" or approached. This ensures that the people using the Talking Signs system have information available about their relative location to the goal as they move towards it. Travelers who are blind can get to the destination by walking in the direction from which they receive a clear message. They do not need to remember directions. They just travel toward the sign they hear, in the same way that sighted people travel toward a sign or landmark they see.

Talking Signs transmitters have been installed in a number of intersections in downtown San Francisco. The application involves providing two types of information to pedestrians. The first tells the user where he or she is located; it is comparable to the information posted on the visual signs at each intersection. The repeating message users hear from the speakers of their hand-held receivers when they are walking down the sidewalk is, for example, "Traveling East on the 800 block of Grove Street toward Larkin Street." When users near the curb, another

message is heard through the receiver's speaker. This "pedestrian crosswalk indicator" message tells users the condition of the traffic signal. It repeats, for example "Wait... Larkin Street" or "Walk Sign.... Larkin Street," the particular message depending upon the status of the visual walk/wait sign. This message can be heard only if the pedestrian is in the crosswalk and aiming the receiver in the direction of the opposite corner. It is thus an aid to finding the crosswalk and aligning to face the opposite corner, not only to informing the pedestrian about the status of the pedestrian cycle for crossing a particular street.

Research was conducted to investigate the effects of Talking Signs vs no Talking Signs for 20 blind participants, on the safety, precision, independence, and knowledge of intersection design and control when crossing streets at four complex signalized intersections in San Francisco with and without information provided by the Talking Signs system. Each participant was compared with him/her self on nine measures of street crossing proficiency at each of the four intersections, in both the Talking Signs and no Talking Signs conditions.

For the purposes of this project, additional information regarding intersection characteristics such as the shape of the intersection, the width of the crossing, the direction of the crosswalk and the nature of the signal was available to participants on a simulated second channel. These extended messages which communicate special attributes about an individual intersection could be added to the approach message following the street name. Alternatively, this additional information may be provided through a different receiver channel.

Binomial (step) tests were conducted in which each participant was compared with him/her self on each of the nine measures at each of the four intersections, in both the Talking Signs and no Talking Signs conditions, and then a statistic was computed to determine the probability that differences between performances using Talking Signs and no Talking Signs were significant.

Participants were significantly more successful on eight of the nine measures when using Talking Signs than when not using Talking Signs. Nineteen of 20 participants were significantly more successful when using Talking Signs than when not using Talking Signs. Participants included persons using both long canes and dog guides, persons with and without hearing loss, persons who considered themselves to be good to excellent travelers, and persons who did not consider themselves to be good travelers.

The following percentages indicate the nature and magnitude of differences in street crossing performance with and without Talking Signs.

	Talking Signs	No Talking Signs
Began crossing during the Walk phase	99%	66%
Started within crosswalk	97%	70%
Started from a heading toward opposite corner	80%	48%
Got to correct corner within crosswalk	87%	60%
Found crosswalk with no assistance	99%	81%
Identified Walk phase with no assistance	100%	76%
Crossed street with no assistance	97%	81%
Knew shape of intersection	86%	46%
Knew type of intersection control	84%	50%

Talking Signs at intersections significantly improved safety, precision, and independence in street crossing, as well as knowledge of intersections, for good, frequent, independent blind travelers, using a long cane or dog guide, including those with hearing loss. Talking Signs also resulted in improved street crossing for persons who considered themselves relatively poor travelers, and who did not normally travel in unfamiliar areas.

Providing information at signalized intersections is one small, but very important piece of the challenge to provide a unified signage technology which allows travelers with visual impairments to move efficiently, safely and independently from one environmental context to another in a "seamless" fashion. The goal of the Talking Signs has been to collaborate with entities (both public and private) to provide a standard mechanism by which a visually impaired traveler can obtain the information necessary in an unfamiliar environment to cross an intersection to get to an ATM or fare machine, go from a fare machine to a transit boarding platform, go from a bus stop to a particular bus, go from a bus to a building, and travel to destinations in the building.

This effort has resulted in substantial success. In San Francisco, BART, the Municipal Railway and Caltrain are committed to making their transit systems accessible using Talking Signs (one BART/Muni station is already installed as well as a number of Muni LRV platforms). The City Hall, Civic Center Courthouse, New Main Library, Moscone Convention Center, Yerba Buena Park, Yerba Buena Children's Center and other public and private venues are currently installing Talking Signs transmitters (several projects are now complete). They have been installed in downtown San Francisco on a number of bus shelters and modern, self-cleaning public toilets. The San Francisco Foundation has generously provided funds to buy receivers for blind and visually impaired users (distributed through a program with our local Lighthouse for the Blind). The same acceptance has begun in New York, Austin, San Diego, Boston and

Baton Rouge. Mitsubishi has recently installed their first Talking Signs system in Yokohama. The Venice-Mestre Railroad Station has installed a pilot project. Luminator, the largest US supplier of bus and rail destination signs is offering a Talking Signs module compatible with the industry standard interface used by a number of destination sign manufacturers.

Billie Louise (Beezy) Bentzen has been an orientation and mobility specialist for more than 25 years and is also an experimental psychologist. She has conducted research on numerous issues related to environmental accessibility including street detection, tactile maps and tactile, print and audible signage. She is the author of two chapters in the new *Foundations of Orientation and Mobility*, “Orientation Aids,” and “Environmental Accessibility.”

Linda Myers is an orientation and mobility specialist with Marin County Public Schools, and is on the faculty of the orientation and mobility personnel preparation program at San Francisco State University. She has been involved in human factors research on Talking Signs since 1994.

THE EFFECTIVENESS OF THE USE OF THE SONIC PATHFINDER AS A SECONDARY MOBILITY AID IN SELECTED TRAVEL ENVIRONMENTS

STEVEN LA GROW
School of Health Sciences
Massey University

The Sonic Pathfinder is an electronic travel aid (eta) designed to function as a secondary mobility aid. Such devices are used in conjunction with primary mobility aids and provide supplementary information which allows for the detection and location of objects not normally detected by primary mobility aids (e.g. those at head height) or at a greater distance providing for preliminary preview of upcoming objects. This particular device is designed to meet both of those functions (Heyes, 1995).

Ideally, such aids do not interfere with the function or efficiency of the primary aid with which it is meant to be used. Primary mobility aids are designed to provide as complete protection as possible to the nonvisual traveller in terms of both object and surface preview (Blasch, La Grow & De l' Aune, 1996). Primary mobility aids include the use of a human guide, dog guide and the constant contact and touch techniques when used with the long cane (La Grow & Weessies, 1994).

The Sonic Pathfinder is designed to provide for early preview of objects in the front of the traveller at up to 3 meters or approximately 2 meters prior to their detection by the long cane. While there is a side function, attention is given to objects directly in the path of the traveller and therefore the device will selectively attend to those objects when present while ignoring those to the side (Heyes, 1995). The Sonic Path Finder only informs the traveller of objects that are getting closer to the traveller. The auditory signal which alerts the traveller to objects corresponds to four notes on the musical scale. As the distance to the objects decrease, the note on the scale gets progressively lower. Each note represents a distance of approximately o.3 meters of travel (Heyes, 1995). Information concerning objects that are at a constant distance from the traveller or are moving away from the traveller will not be transmitted to the traveller. Therefore, the device is silent much of the time.

The Sonic Pathfinder is head mounted and, as a result, allows for hands free operation. It also allows for the detection of objects above waist level which appears to be a valuable supplement to the long cane, which unlike the other primary mobility aids has no means of performing this function. It does not, however, provide for surface plane preview and therefore cannot be considered a primary mobility aid.

The purpose of this study is to demonstrate the efficacy of the Sonic Pathfinder as a secondary mobility aid for travel in selected travel environments for a very competent and capable traveller. The dependent measures used in this study were elapsed time and unintentional contact. A decrease in elapsed time and/or the number of unintentional contacts made

would, theoretically, indicate that the use of the device does result in increased efficiency in travel. A single case experimental design (simple reversal) was used to establish control. These designs have been recommended for use for research with visually impaired persons because of the individualised nature of our interventions.

Method

Subject

The subject for this study was a totally blind, 43 year old male who had lost his sight at the age of 8 due to bilateral retinal detachments. He is an exceptional traveller, has used various electronic mobility aids in the past and had expressed an interest in trying the Sonic Pathfinder.

Procedure

A simple reversal design (A-B-A) was used to establish control of the independent variable over the dependent. The independent variable in this study was the use/non-use of the sonic pathfinder as a secondary mobility device. The non-use condition corresponded to a baseline phase (A) which was used for comparison to the intervention phase (B) where the device was used. Repeated trials were observed in each phase to ensure stability and establish a level and trend for comparison.

Elapsed time for completion of a route was recorded as the primary dependent variable and unintentional contacts as the secondary. Elapsed time was recorded from the time the subject began to travel the route to the time he concluded it. The clock was not stopped at any time during the run, nor was time spent waiting for street crossings factored out in any way. Unintentional contacts were defined as any contact made with an object or individual that was not the result of a planned or intentional movement. Contact with cane or body was recorded.

At least three trials were run in each phase of the study to ensure that stability in the amount of time taken to complete the route was established. The number of trials in each phase could be extended to ensure that stability was established. Data was collected over several days in two environments: the Square, and the Plaza.

The Square was selected as a complex and busy environment in the city in which this study was conducted. The Square is the center of the central business district of Palmerston North, a city of about 75,000 people in the north island of New Zealand. It consists of 8 blocks of retail outlets and office buildings. To walk around the perimeter of the Square one must make eight street crossings. Four of these crossings were controlled by pedestrian control lights and four were Zebra Crossings where pedestrians have the right of way. The Square is the busiest area of town in terms of both pedestrian and vehicle traffic. The Square was selected as the environment of travel for this study since it was designated by the subject as an area where he believed the Sonic Pathfinder could be of help to him in his travel. In addition to heavy traffic. the footpaths are cluttered with a variety of obstacles for the traveller to negotiate including

street furniture, bike racks, sandwich boards, product racks and displays, as well as, parking meters, lamp posts and signs.

The Plaza is an indoor, single level, shopping mall. It has irregular shaped passageways lined with retail outlets. The outlets are open to the passageway during business hours. There are signs, product displays, planters and benches located in the walkway. The concentration of pedestrian traffic is the highest here of any place in the city. One particular route from the main entrance to the west entrance was identified by the subject as a problem area for him that he hoped that the Sonic Pathfinder may be of some help in negotiating.

The subject was introduced to the Sonic Pathfinder in the manner described in the accompanying manual. Once the subject was comfortable with the aid, training was discontinued and baseline data was collected. The route around the Square was explained and the subject asked to travel its perimeter. He did so a total of 6 times, 3 in the initial baseline phase and 3 in the intervention phase. This was done over 2 days. The Plaza was then introduced. He travelled the route in the Plaza a total of 16 times, 6 in the initial baseline, 7 in the intervention phase, and 3 in a return to baseline phase. This was also done over a 3 day period. The time it took to traverse this route was also determined using the human guide technique for comparison reasons. This was done three times to get an average speed taken over the three days.

Results

The subject travelled the route around the square in an average of 14 minutes and 34 seconds during baseline with a range of 13 minutes 37 seconds to 15 minutes 18 seconds. The average time taken to travel the same route increased to a mean of 16 minutes 42 seconds when using the Sonic Pathfinder, with a range from 16 minutes 28 seconds to 17 minutes 8 seconds. The mean time elapsed returned to a mean of 14 minutes 15 seconds when baseline conditions were reinstated with a range in this phase of 14 minutes 40 seconds to 14 minutes 57 seconds. Thus, the use of the Sonic Pathfinder did not result in a decrease in the amount of time it took for the subject to travel the route around the Square. The average number of unintentional contacts made during the baseline phase was 6.6 and ranged from 3 to 10. The average number of contacts when using the Sonic Pathfinder was also 6.6. The range during this phase 4 to 9. A return to baseline phase was not introduced since the intervention did not result in a change in either the primary or secondary dependent variables. The subject was then introduced to the Plaza.

The route in the Plaza was short but extremely congested. The average amount of time to travel this route using a human guide was determined for additional comparisons. The subject and guide travelled from the main entrance in the Plaza to the west entrance in an average of one minute and two seconds. During baseline he did this in an average of 1 minute, 27 seconds with a range of 1 minute 14 seconds to 1 minute, 41 seconds. During the intervention phase he did this route in an average of 1 minute, 19 seconds with a range from 1 minute, 7 seconds to 1 minute, 30 seconds. Upon return to baseline, he averaged 1 minute, 15 seconds with a range from 1 minute, 13 seconds to 1 minute, 17 seconds. The mean number of unintention-

al contacts made during baseline was 2.66 and ranged from 1 to 5. The average number of contacts during the intervention phase was 2.3 with a range from 1 to 4. Upon return to baseline, the average number of contacts was 2 with 2 unintentional contacts made in each of the 3 trials in this phase.

Discussion

The use of the Sonic Pathfinder did not increase the efficiency of travel in terms of either elapsed time or unintentional contact in either of the environments in which it was used. However, it did appear to change the nature of the contacts. The subject was often observed avoiding an object in his path. However, in doing so, he often stepped into another. Usually, this appeared to result in less of an impact than contact with the original object would have been. The subject did travel slower in the Square while using the aid than he did before. Yet, he stated that he did feel more comfortable and felt that this was so because he often slowed down as moved into or through objects. He, in fact, often paced himself behind other pedestrians whom he would have made cane contact with before. He stated that he liked the aid and the information provided but probably would not bother using it while travelling in the Square. His opinion of the use of the aid in the Plaza was markedly different however. He stated that he was comfortable travelling through this environment only when using the Sonic Pathfinder. He particularly enjoyed the extended preview afforded by the device. He felt he was able to make more controlled contact with objects in his path, were able to anticipate collision courses and slow to soften the impact or stop to avoid them. He did find that he was learning not to try to sidestep them since he found that this often resulted in stepping into another object.

He particularly liked the fact that the Sonic Pathfinder was silent when objects were not in his path. He was happy that the ear pieces did not interfere with his hearing. He uses ambient sound extensively while travelling and found that this was still possible while using the device. He was quite enthusiastic about the aid and felt that it would in fact contribute to his efficiency as a traveller in selected environments.

It is apparent that the measures used in this study were not appropriate for identifying the value of the Sonic Pathfinder for this subject. Other dependent variables need to be explored. In the mean time, subjective data should continue to be considered.

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DEVELOPMENT OF AN ADL INSTRUMENT FOR ELDERLY PERSONS WITH AGE-RELATED MACULOPATHY

S. DAHLIN-IVANOFF (1,2), U. SONN (2), E. SVENSSON (3)

1. Department of Ophthalmology, Göteborg University, Göteborg, Sweden
2. Department of Geriatric Medicine, Göteborg University, Göteborg, Sweden
3. Biostatistics Branch, Mathematical Statistics, Chalmers University of Technology, Göteborg University, Göteborg, Sweden.

ABSTRACT

In order to evaluate a recently developed health education program the literature on ADL (Activities of Daily Living) instruments targeting persons with an age-related maculardegeneration was reviewed. Despite the fact that this disease is so common, the review reveals few ADL-instruments. Responsiveness, defined as the ability to detect true changes over a period of time, is essential for quality assessment of an evaluative instrument.

The purpose of this study was to develop an ADL instrument targeting elderly persons with age-related maculopathy, which can be used in clinical practice for evaluative purposes.

The non-parametric method for separating different types of variability was used. The level of disagreement between test-retest judgements was studied by means of contingency tables. ROC curves were used to illustrate and to measure the systematic shift in position and concentration of the test-retest categorical judgements. The level of additional random disagreement was measured separately.

This test-retest study showed that the ADL-instrument had a high level of test-retest stability, which is a condition for responsiveness. The ADL-instrument could therefore detect true longitudinal changes, which means that it has great potential as a tool for follow up, in research settings, as well as in clinical practice.

MOBILITY TRAINING OUTCOMES

WILLIAM DE L'AUNE, BRUCE BLASCH, AND MICHAEL WILLIAMS
Rehabilitation R&D Center (151R), VA Medical Center
1670 Clairmont Road, Decatur, GA 30033

Background of Veterans Administration Blind Rehabilitation Outcomes Research

Professionals in the field of blind rehabilitation have struggled with the issue of measuring rehabilitation outcomes for decades. One of the most promising studies in the United States was conducted in Michigan, where the Commission for the Blind in 1982 developed a 57-item assessment protocol for older people who were legally blind. This research built upon the conceptual model of the International Classification of Impairments, Disabilities, and Handicaps proposed by the World Health Organization. The Michigan outcome study measured changes on a two-dimensional scale addressing independence and difficulty. Participants demonstrated significant changes on both independence and difficulty scales as a result of receiving outpatient rehabilitation services. Because of a lack of resources, these instruments were never evaluated for validity and reliability. This severely limited their value and usefulness for rehabilitation outcomes research.

A second effort to develop assessment instruments occurred in 1988 when the Southeastern Blind Rehabilitation Center (SBRC) in Birmingham, Alabama, led an effort by Department of Veterans Affairs (DVA) Blind Rehabilitation Center (BRC) staff nationwide to modify an existing inventory designed for use with individuals who experienced physical impairments. The Functional Independence Measure (FIM) was developed by the Buffalo General Hospital of the State University of New York and supported by a grant from the National Institute for Disability and Rehabilitation Research (NIDRR). The FIM relies upon a seven-point scale to assess sphincter management, mobility, locomotion, communication, and social cognition. The staff at the SBRC revised the FIM to measure functional capabilities of patients enrolled in the DVA's blind rehabilitation program specifically visual abilities, orientation and mobility, living skills, and manual skills. The resulting measure was referred to as the Blind Rehabilitation Functional Independence Measure (BRFIM). The instrument was pilot tested in 1989 in various DVA BRCs, and feedback from the pilot testing raised significant questions about validity, inter-observer reliability, scaling, and overall usefulness.

In 1990, Chiefs of the BRCs and the Director of Rehabilitation Education Programs, VA Central Office, suggested that the Rehabilitation Research and Development Center in Atlanta coordinate an effort among the BRCs to develop functional independence measures for blind rehabilitation clients. The Director of the VA Blind Rehabilitation Services supported this concept and several meetings were held to develop a design for a merit review-funded proposal. This resulted in the VA-sponsored study "Functional Independence Measure for Blind Adults (FIMBA)," C699-RA, conducted in conjunction with Blind Rehabilitation Service (BRS) by the Atlanta Rehab R&D Center. This project described four characteristics considered desirable in an outcome measurement tool:

1) Visual Impairment Service Team (VIST) coordinators should be involved in assessing needs, goals, and abilities of clients;
2) the tool should be easy to administer and should not intrude upon the workload of the Centers;
3) it should be sensitive to change in client behavior, thus measuring rehabilitation gains; and,
4) the instrument should contain both self-report and performance items.

A Pre-Admission Interview (PAI) protocol was developed to capture demographic characteristics, self-reported information about social supports, general health, other health conditions, as well as vision. The centerpiece of the PAI was a series of questions that asked the client to self-report the frequency, difficulty, and satisfaction with the performance of 35 specific tasks generally associated with blind rehabilitation training. Twenty-three tasks dealt with functional daily living activities; six with low vision related issues, and six with psychosocial issues. The content and format of the instrument represented the consensus of nearly 50 people involved in focus groups convened over a six month period to design the instrument, and it reflected the concerns of those participating in the study. In addition to this instrument, the focus groups determined the selection or designed the content and scaling of five clinical instruments to be used at the BRCs during the project. Although considerable work was accomplished in the design and content areas of the FIMBA instruments, the project proved to be less successful in the data collection and analysis aspects. With the exception of the PAI, the performance measuring instruments proved to be unwieldy. Insufficient data was accumulated on a pre-post rehabilitation basis to establish the reliability, validity or responsivity of any of the instruments, although the preliminary findings appeared promising.

During the FIMBA project, the Atlanta VA Rehabilitation R&D Center in cooperation with BRC staff and VISTs, developed and performed preliminary evaluations on the first comprehensive, interdisciplinary set of outcome measures to be used in the rehabilitation of blind and visually impaired persons. With the exception of the Mississippi State University, NIDRR RTC study, “Title VII, Chapter 2 Independent Living for the Older Blind,” no state or private rehabilitation services providers have devoted such a large expenditure of resources to develop such measures.

Based on these instruments and in response to increasing demands for practical outcomes measures for Blind Rehabilitation, the Atlanta Rehab R&D Center hosted a meeting of the BRS Task Force on Outcome Measures in the Spring of 1996. Under the expanded scope of “Development of an International Data Base of Cane Techniques,” C813RA, the Blind Rehabilitation Service DataBase (**BRSDBase**) and the Blind Rehabilitation Service Satisfaction Survey (**BRSSatSur**) emerged six months after that meeting and were implemented by project staff. The Blind Rehabilitation Service Follow-up Outcomes Survey (**BRSFOutSur**) was developed during the remainder of that year. Project staff coordinated data collection and management for the final year of the project. The DVA Blind Rehabilitation Service (BRS) is now using the preliminary results of both instruments.

The use of these instruments was proposed for use by the National Accreditation Council for Agencies Serving the Blind and Visually Handicapped (NAC). A meeting was called in Atlanta in May 1997, to implement this proposal. Over 20 Non-DVA agencies as well as representatives from the American Council for the Blind (ACB) and the American Foundation for the Blind (AFB) participated in this meeting. The initial data collection and instrument development effort described in this report has be expanded to include data from the participating Non-DVA group and to establish the psychometric properties (reliability, validity, and responsivity) of all of the instrument in the currently funded ongoing study, "Outcomes of Blind Rehabilitation," C2179R.

Research Protocol

Instrument Development

The Blind Rehabilitation Service Task Group on Outcomes (**BRSTGO**) working in conjunction with project staff, developed two instruments during the first six months of the expanded project. The first developed was the Blind Rehabilitation Service Data Base (**BRSDBase**), a form designed to be filled out by clinical staff at the Blind Rehabilitation Centers. This form contained demographic and medical information about the patient. It also contained information about the veteran's home environment and programmatic information considered important by the BRSTGO. This form was circulated to all of the BRC Chiefs who commented on the content.

The second instrument developed by the BRSTGO and project staff was the Blind Rehabilitation Service Satisfaction Survey (**BRSSatSur**). This is a self-report, telephone administered, 18-item instrument designed to measure veteran satisfaction with the overall blind rehabilitation program and also with specific components of the program.

The BRSTGO used standard psychometric principles to derive the initial form of the self-report instrument, the Blind Rehabilitation Service Follow-Up Outcomes Survey (**BRSFOutSur**) based on resources available. The items were selected from large item pools generated during the BRFIM and FIMBA projects. Discipline specific groups (Orientation and Mobility Skills, Living Skills, Manual Skills, and Vision Skills) selected domain specific items. Each group was assigned a national outcome coordinator who worked with the skill area supervisors from each of the BRCs. Each supervisor, in turn, worked with his or her individual staff members to select items they thought best reflected the functional changes they desired as rehabilitation outcomes. A multidimensional response set was developed to reflect the interaction of outcomes (frequency, level of independence, satisfaction) and determinants (need and interest). Particular attention was given to feasibility of administration of the instrument in terms of its length and threats to confidentiality. This process resulted in the BRSFOutSur, a 50-item inventory. Spanish translations of the instruments were developed in conjunction with staff from the San Juan BRC.

Although not connected to this project, we anticipate having access to the data from the Blind Rehabilitation Service Training Outcomes (**BRSTrOut**) in 1998 as a part of project C2179R. The BRSTGO and project staff are developing the BRSTrOut in conjunction with a proposal submitted for review (LRO W980180). This instrument will be based on the functional areas surveyed by the BRSFOutSur and will document the veteran's domain specific performance

as well as the type and quantity of rehabilitation services delivered during the course of his or her blind rehabilitation program. This will rely on clinician report rather than self-report and will be used to validate the BRSFOutSur

Data Collection

A blind rehabilitation clinical staff person at completion of the blind rehabilitation program filled out a Blind Rehabilitation Service DataBase (BRSDBase) form for each client. Because these data paralleled information already gathered in the course of rehabilitation and simply provided a unified data gathering mechanism, this burden did not prove to be a hardship to the BRC clinical staff. Information about the project and the subsequent telephone interviews was provided to the veteran at this time. All data was sent to the Atlanta Rehabilitation R&D Center at the time of the subject's discharge.

A research associate from the Rehabilitation R&D Center telephoned the subject after receipt of the BRSDBase information, usually within a month of completion of the blind rehabilitation program. The research associate informed the subject of his or her right to refuse the interview, the confidentiality of all information obtained, and the lack of impact of the information on services provided to the subject. After gaining permission to continue, the research associate administered the BRSFOutSur for post-rehabilitation function and the Blind Rehabilitation Service Satisfaction Survey (BRSSatSur). This usually took less than 45 minutes. An appointment was made for a second phone interview. This interview allowed the research assistant to administer the BRSFOutSur for projected pre-rehabilitation function ("Respond to these same questions in terms of your abilities *before* rehabilitation"). This interview usually took less than 25 minutes. All information acquired through these efforts was transmitted in aggregate form on a quarterly basis to the referring BRC and to Blind Rehabilitation Service. Data accumulated through the year of the project is presented in this final report. Risk adjustment and case mix models as well as validity, reliability and responsivity indices based on this data will be developed in years two and three of project C2179R.

Results

BRSDBase - Blind Rehabilitation Service Data Base

Project staff were able to obtain demographic data on 1320 visually impaired veterans who took part in DVA Blind Rehabilitation programs during the one-year duration of the data gathering aspects of this project. These data form the largest and most detailed data set currently available on veterans served by the Blind Rehabilitation Service of the Department of Veterans Affairs. The average age of the veteran was 66.8 (SD=20.9) years. As expected, gender was heavily biased towards males (95.4%). Race was predominantly Caucasian (69.8%) with 20.5% African-American, 8.3% Hispanic, 1.1% Native American, and 0.2% Asian/Oriental or Pacific Islander.

BRSSatSur - Blind Rehabilitation Service Satisfaction Survey

The research team also developed the Blind Rehabilitation Service Satisfaction Survey (BRSSatSur). Through the use of this instrument, data has been gathered from 690 veterans about satisfaction with programmatic elements of the blind rehabilitation process. The information derived from this instrument and is currently being used at both VISN and VAHQ levels to evaluate management performance. It should be noted that question 15 ("How would

you rate your overall satisfaction with the blind rehabilitation program?") has been chosen by VAHQ as the overall index of Blind Rehabilitation Satisfaction. Results to date indicate that 681 of the 690 veterans surveyed (98.7%) express either "satisfaction" or "complete satisfaction" in response to this question.

BRSFOutSur - Blind Rehabilitation Service Follow-up Outcome Survey

The central measure used in this project was the BRSFOutSur, developed by the Blind Rehabilitation Service Task Group on Outcomes in 1996. Data has been gathered from 672 blinded veterans using this instrument. The BRSFOutSur samples behaviors associated with each of the four major Blind Rehabilitation skill area domains (Orientation and Mobility, Communication and Activities of Daily Living, Manual Skills, and Visual Skills) as well as other behaviors associated with general adjustment to blindness. Data has been gathered on the changes between the Post-Rehabilitation Responses and the Projected Pre-Rehabilitation Responses for 360 blinded on the eleven items related to mobility contained in the instrument.

Acknowledgment

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DETECTABILITY OF WARNING TILES BY FUNCTIONALLY BLIND PERSONS EFFECTS OF WARNING TILES WIDTH AND ADJOINING SURFACES TEXTURE

AGATHE RATELLE (1) ; CAROLE ZABIHAYLO(1) ; JACQUES GRESSET (2)

1. Institut Nazareth et Louis-Braille, Longueuil, Québec

2. École d'Optométrie, Université de Montréal, Montréal, Québec

INTRODUCTION

Detectable warning tiles consisting of truncated domes integrated in the walking surface are an efficient way to prevent subway platform falls for visually impaired persons (Bentzen, Nolin, Easton, Desmarais, & Mitchell, 1994). Prior studies suggest that a 61-cm-(24-in)-width was sufficient to allow a 90% underfoot detectability rate, which was considered safe enough (Bentzen, Nolin, Easton, Desmarais, & Mitchell, 1994). The efficiency of warning tiles in the conditions found in the Montreal subway (rough adjoining surfaces and blind travellers wearing thick-soled footgear) was evaluated in a preliminary study by the authors, with 61-cm- (24-in)-wide warning tiles. Detectability rates ranged from 40% for Armortile (as compared to 100% in American studies) to 61.5% for High Quality No Field (HQNF) (Ratelle, Zabihaylo, & Gresset, 1995). Adjoining surfaces textures and shoe types were variables suspected of contributing to the differences in rates. The objective of the present study was to evaluate the effect of the of the adjoining surfaces textures and determine the necessary width to allow the desired 90% detectability rate.

METHODS

Two groups of 36 persons were selected, one composed of functionally blind subway travellers and a control group composed of sighted persons. Four different pathways were constructed in a laboratory setting. The pathways consisted of two different types of tiles (Armortile and HQNF) and two different adjoining surfaces (smooth and very rough). Participants wore a blindfold and a personal listening device, emitting white noise. They were guided to different unknown starting positions. They were required to travel three consecutive times on the pathway using a guide-rope. For each trial, they were asked to stop as soon as they felt the warning tile. After completing each pathway, they were asked to rank the detectability in terms of safety and ease of detection. The order of presentation of walking surfaces and starting positions varied among the participants. All trials were videotaped.

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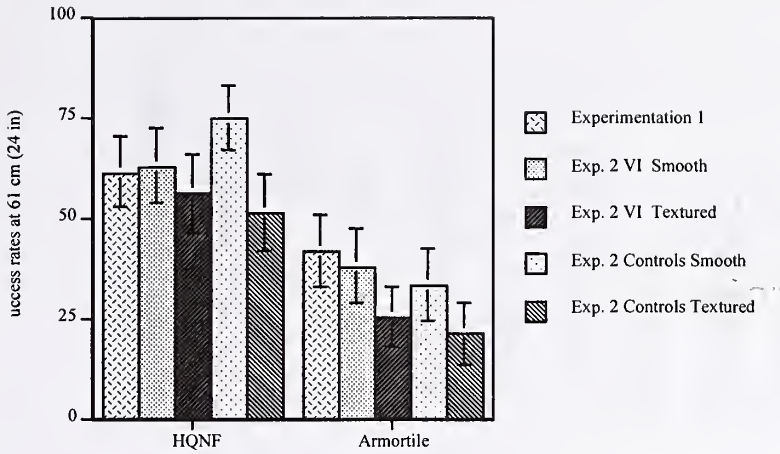


*VI. : Visually impaired

Figure 1: Comparison of detectability rates at 61 cm (24 in) in the preliminary study and the present one.

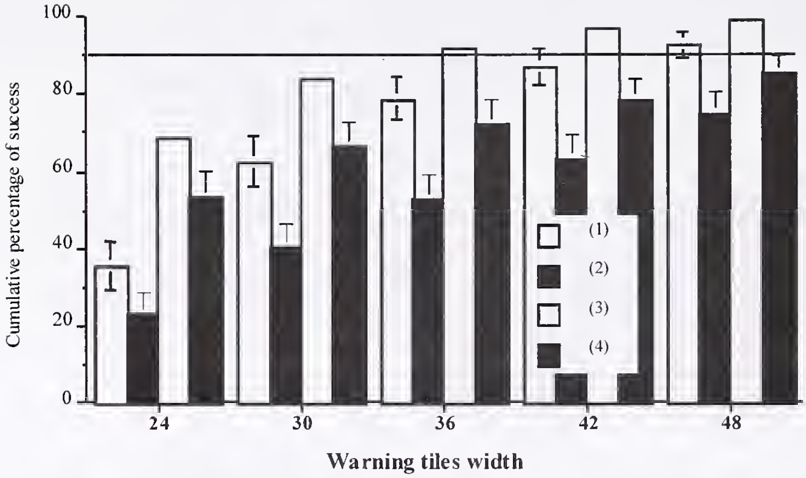
RESULTS

Effect of Distance and Comparison of Performance Between the two Groups and Comparison with Results of the First Study

There was no significant difference with regard to different starting distances. Results obtained from the control group were not statistically different from those of the visually impaired subjects. Comparing the results of the blind group of this study with those of the previous one, we found that results obtained with HQNF tile adjacent to a smooth surface (63%±9.1) were comparable to those of the first study where the adjacent surface was bumpy (61.5%±8.8) (see figure 1). With regard to Armortile, the detection rates between smooth surfaces (38%±9.1) and the surface of the first study (41.9%±8. 9) were also comparable.

Surface Depth, Detection Rate and Tile Ratings

Detection rates were figured in regard to different warning surface widths. With the degree of freedom of 95%, a 76cm (30in) wide HQNF met the 90% criterion when adjacent to a smooth surface. At the same width, Armortile produced a rate of 62.5%±6.5. We observed significant differences between the two tiles for all widths (see fig. 2). Results obtained from both tile types adjacent to very rough surfaces indicate that such surfaces have a negative effect on detection rates, considerably reducing them. Regardless of the width, HQNF produces a higher performance, more than double at a depth of 61cm (24 in) (51.8%±6.6 VS 22.3%±5.5) and was the most appreciated by the consumers. It was also determined that factors such as gender, age, type of aid used or origin and cause of visual impairment were not statistically relevant to detection rates.



(1) Armortile adjacent to a smooth surface, (2) Armortile adjacent to a rough surface, (3) HQNF adjacent to a smooth surface, (4) HQNF adjacent to a rough surface.

Figure 2: Detection rates relative to warning surface width for all subjects, mixed distances.

DISCUSSION

Results obtained in the current study indicate that the type of slate encountered in the Montreal subway can be considered as a smooth surface and has little effect on detection rates. Differences in the American study and our studies could be attributed to subjects wearing thicker-soled shoes. However, more recent non-published studies obtain detection rates similar to ours and reveal that shoe sole thickness has no significant effect on detection rates (Bentzen, personal communication). The optimal 90% detectability rate is only obtained with a 76-cm- (30-in)-wide HQNF tile. This could be the necessary width to ensure the safety of blind persons travelling without a mobility aid. What is the real risk level for the visually impaired population with a 61-cm- (24-in)-wide warning tile? Analysis of clientele characteristics and especially the clientele at risk provided additional depth to the study.

In the first study, it was estimated that the visual acuity required to detect a 61-cm- (24-in)-warning surface at 3 meters (10 ft) was 20/24,874 (when the tile is seen from an angle of 20∞ 45'). This measurement indicated that the majority of visually impaired persons (approximately 85%) can visually locate a 61-cm-(24-in)-safety yellow warning tile at 3 meters (10 ft) (Ratelle, Zabihaylo, & Gresset, 1995).

As for guide-dog user, a 61-cm-(24-in)-warning tile might be safe enough, since parallel and diagonal approaches will be readily detected by the user (underfoot detectability). As for the perpendicular approach, we can expect a guide-dog to be wary of a surface change, slow down its pace and stop before the edge of the warning tile.

More studies confirm that use of the cane offers a 100% detectability rate with a large variety of warning tiles (Bentzen, Nolin, Easton, Desmarais, & Mitchell, 1994; Toronto Transit Commission, 1990). Certain categories of cane users remain at risk. Inadequate cane technique and

disorientating situations may impair the traveller's reaction time and detection readiness.

This study demonstrates that a 76-cm-(30-in)-warning tile provides a 90% underfoot detectability rate. Widening the tile involves a significant cost increase that may not be met by authorities. As for the 61cm (24in) warning tile, stress must be placed on orientation and mobility skills and techniques to ensure safety for the majority of the functionally blind travellers, regardless of the aid used. What is an acceptable level of security? Ultimately, the decision remains the consumer's prerogative.

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JOINT AND DIVERGENT ATTENTION TOWARDS MOBILITY GOALS: DIRECTING THE ATTENTION OF THE MOBILITY INSTRUCTOR TOWARDS THE DIRECTED ATTENTION OF THE STUDENT

JON MAGNE TELLEVIK,
HARALD MARTINSEN, MAGNAR STORLILØKKEN,
BENGT ELMERSKOG.
Tambartun National Resource Center for special education of the visually impaired.
and
Department of Special Education, University of Oslo.

INTRODUCTION

In order to master traveling in mobility routes the student must learn to attend to the goal and sub-goals, like landmarks, of travel, and the means of attaining these goals (Tellevik, Storliløkken, Elmerskog, Martinsen, 1994). When the key questions in mobility instruction is formulated like this, it highlights the necessity for the mobility instructor to monitor the direction of attention of the student. This implies that effective mobility route learning and learning progression depends on the mobility instructor directing of the students attention towards goals, landmarks and shorelines in a functional manner.

Learning progression may be evaluated in relation to qualitative shifts in behavior which in turn are feedback to the instructor in relation to instructional initiatives (Tellevik, Elmerskog, Martinsen, Storliløkken, 1996). There are several changes in behavior associated with learning in routes, like anticipation to landmarks, short-cuts, changes in communication and mobility techniques etc. Recording such changes in behavior and attention level should, therefore, improve the reliability and validity in the study.

In order to monitor learning progression it is thus important to be aware of what kind of help is appropriate for the pupil. From the perspective of the mobility instructor, the pedagogical challenge is to direct the attention of the pupils towards what is to be learned. As training progresses, the instructor tries to give successively less help as the pupil become progressively more able in travel. To evaluate learning progression, it is necessary to define criteria for appropriate help, and to decide on how to observe directed attention.

The present study examines the effect of instructor behavior on the students directed attention towards goals, landmarks and shorelines in mobility routes.
This was accomplished by designing a system for monitoring learning progression describing how attention is directed towards salient parts of the route, and the observation of instructors behavior in relation to the students attention and changes in behavior in mobility route learning.

METHOD

18 blind and partially sighted subjects participated in the study. A system for monitoring learning progression in route learning, shown in figure 2, describing directed attention in relation to landmarks and shorelines in an 8-point Guttman scale, and a form for recording behaviors related to learning progression was prepared.

Table 2.
ATTENTION LEVEL AND DIRECTED ATTENTION

Attention level	Intervention by the guide	Place of occurrence
1.	Directed attention towards the goal of the route, landmarks, shorelines, pace and direction continuously	At and between landmarks
2.	Directed attention towards the goal of the route, landmarks, shorelines, pace and direction when necessary	At and between landmarks
3.	Directed attention towards the goal of the route, landmarks, shorelines, pace or direction when necessary	At and between landmarks
4.	Directed attention towards the goal of the route, landmarks and shorelines when necessary	At and between landmarks
5.	Directed attention towards the goal of the route, landmarks and shorelines when necessary	At landmarks
6.	Directed attention towards the goal of the route and landmarks when necessary	At landmarks
7.	Directed attention towards the goal of the route when necessary	At landmarks
8.	No help	

The levels of attention are supposed to reflect the student's competence in travel, mainly in relation to goals and sub-goals and in relation to independence in travel. Psychologically such competence implies changes in the learning problem which will influence how attention is directed to salient features in the layout.

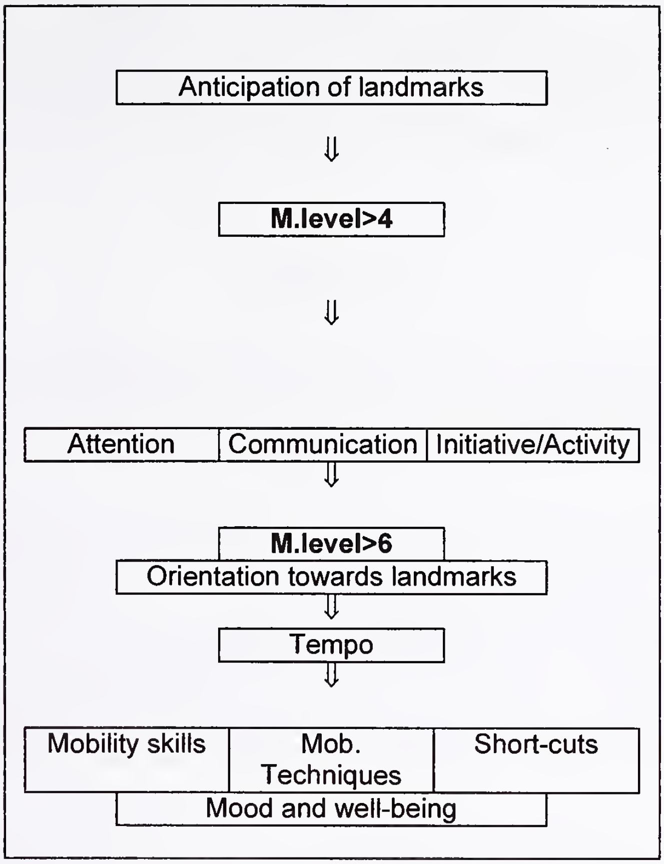
Observing how the mobility instructor helps the student to relate to significant events may be considered as describing the behaviour of the instructor; how attention is directing towards salient features, like landmarks or shorelines, in mobility route training. Directing the attention of the student implies sensitivity to how the student attends to features in the spatial layout, and how to use this knowledge to help the student to develop mobility skills. If too little help is given it will inhibit the student's initiatives. If too much help is given it will prevent the instructor from noticing significant changes in behaviour. To make the instructor aware of the effects of various teaching initiatives, we let the instructor record the effects of his/her actions on the student's behaviour by assigning the pupils initiatives towards landmarks to different attention levels, and by observing and recording sseveral kinds of initiatives, or qualitative changes in behavior in mobility training.

RESULTS

Generally, the instructors easily adapted to the system for recording learning progression which imply that the ordinal characteristics of the system was satisfactory. In those cases where to little or too much help was given (non-functional instructor behavior) no learning progression was observed. When this was pointed out to the instructor, the system was easily adapted to by the instructors.

The results from the present study shown in table 2. To evaluate learning progression appearance in time for qualitative shifts in behavior and mean attention level (Mlevel) in relation to goals and sub-goals in the routes was computed. The initiatives selected for presentation are those most important in relation to changes in the learning problem. For each subject, time from onset of training to appearance of different kinds of behaviors was recorded. In order to show the relative order of appearance for these changes, the number of days before appearance for each change were divided by the total number of days of training in the route.

Table 2
Learning progression and
order of qualitative shifts in behavior



The results show, firstly, a clear consistency in relation to incidence and order of qualitative shifts in behavior. Secondly, that the qualitative shifts in behavior correlate highly with functional instruction which are associated with important changes in the learning problem like goal-orientation (Mlevel>4) and orientation towards means to reach a goal (Mlevel>6).

Actions indicating goal-orientation are generally related to selection and perception of goals. The most important indications of goal-orientation is anticipation of landmarks. Anticipation of landmarks should be expected to appear at attention levels greater than 4. As shown in table 2 anticipation of landmarks seem to appear earlier than Mlevel>4. The somewhat earlier appearance of anticipation of landmarks requires an explanation. This result may be explained as a tendency to give too much help. Anticipation of landmarks were followed by other initiatives related to goal-orientation like changes in behavior related to attention towards the environment, to communication, and changes related to initiatives and activities.

The changes in behavior related to means to reach goals appear relatively late in route training because they require cognitive capacity to process information. Such initiatives may be compared with using tools, as applying effective means to reach a goal. This often implies that

we temporarily have direct our attention away from the goal, and focus on other objects or activities that are important for reaching the goal. The indications of orientation towards means to reach a goal may take many forms and seem to appear when interventions by the instructor correspond to attention levels greater than 6 (Mlevel>6). Some are associated with making travel more effective, like changing from tactile/haptic orientation to auditory orientation, or more effective use of mobility techniques and skills. But they may also be related to field knowledge which may release initiatives, like short-cuts, to modify the route to reach the goal more effectively. These initiatives are generally followed by better mood and well-being for the participants in the study.

DISCUSSION

The outcome of this project was, firstly, that learning progression in most cases followed a fixed pattern of qualitative changes in behavior, and, secondly, that these changes are related to how help is given by the instructor.

The results indicate that the serial order of shifts seems to be a stable phenomenon, to be reproduced in any successful mobility training. Acquisition of knowledge linked with attainment of goals, independent travel, and coping experiences, may be linked together in a positive transactional chain. Specifying goal-directed actions introduces a new relationship between the pupil and the environment. Some environmental and social aspects stand out as important with respect to these actions while others are not paid attention to. Thus the goals in the mobility route determine the objectives of interest, and affect what is learned.

Defining attention levels has both a methodological and a practical aspect. Understanding of learning progression in relation to the role of the instructor will improve instructional practice. The purpose of letting the instructor record what he/she is doing is to create a pedagogical effect. In doing so, the instructor becomes aware of how teaching initiatives is monitored in relation to search routines and changes in the student's attention towards goals, and the effects they have on the development of O&M competence. In order to do so the instructor must consider himself as an 'affordance' for directing the student's attention towards landmarks, shorelines and goals in the route. This implies that the instructor psychologically is part of the layout which implies sensitivity to how help influence the attention and behaviour of the student. We think that this approach has important practical implications for how mobility training should be planned, executed, and evaluated.

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A STUDY TO INVESTIGATE THE RELATIONSHIP BETWEEN THE STABILITY OF THE HAND DURING LONG CANE TECHNIQUE AND VEERING IN BLIND PEDESTRIANS

WILLIAM H. JACOBSON, ED.D. TERESA JOHNSON, M.A.
BRUCE B. BLASCH,PH.D. WILLIAM DE LAUNE, PH.D.

University of Arkansas at Little Rock
Department of Rehabilitation
2801 S. University Avenue
Little Rock, Arkansas 72204 U.S.A.

Rehabilitation Research and Development Center
VAMC - Atlanta (151R)
1670 Clairmont Road
Decatur, Georgia 30033 U.S.A.

Background

The project was conceived to determine if hand stability during the two point touch long cane technique contributes to the veering tendency of some blind travelers. It had long been the opinion of orientation and mobility specialists in the field that hand centeredness and hand stability affected a blind pedestrian's ability to walk in a straight line. In fact, the three most popular textbooks in the field (Hill & Ponder, 1976; Jacobson, 1993; and, La Grow & Weessies, 1995) describe the cane technique with the hand centered to minimize veering, among other reasons. However, thus far no studies had been undertaken to determine the validity of this claim.

The research design was developed and piloted with seven students in the University of Arkansas at Little Rock's orientation and mobility program on campus and eight mobility students enrolled in the program in Jackson, Mississippi, in the spring of 1997. In consultation with Ms. Teresa Johnson, Instructor in the Orientation and Mobility program at UALR, and Dr. Newton Suter, Associate Professor in Educational Leadership at UALR, inter-rater agreement measures and testing instruments were developed and refined in this pilot study in the spring of 1997. Clearances were received by the UALR campus Human Subjects committee. Drs. Bruce Blasch and Bill De l'Aune, VA research scientists, consulted with Dr. Jacobson on the final research design and statistical analyses in late spring, 1997. Data were collected in the actual study from the fall 1997 class of orientation and mobility students at UALR and the other cooperating campuses, namely, Western Michigan University, University of Pittsburgh, Pennsylvania College of Optometry, and the University of Massachusetts-Boston. Data were analyzed with preliminary results determined by the end of December, 1997. Final analysis of the results of the experiment will be completed by June, 1998.

Purpose of Study

To determine which cane skill (the traditional method of grasping and swinging two point touch technique or the fingertip method of grasping and swinging two point touch technique) is better than the other in preventing veering in travel for persons with visual impairments.

Research Questions

1. Does maintaining the hand at midline help maintain a straight line of travel?
2. Does using the fingertip method help maintain the hand at midline?
3. Does using the fingertip method help maintain a straight line of travel?
4. Does the traditional method help maintain the hand at midline?
5. Does the traditional method help maintain a straight line of travel?

Hypotheses

1. Hand-centeredness helps ensure a straight line of travel for individuals with visual impairments.
2. The fingertip method helps ensure hand centeredness better than the traditional method.
3. The fingertip method ensures a straight line of travel better than the traditional method.

Significance of the Research

Straight line travel is integral to efficient mobility and spatial understanding of the environment for travelers who are blind or who have severe visual impairments. Should a blind traveler not walk in a straight line, he or she could wander unexpectedly into a street intersection or large, open parking lot. Naturally, this can be a dangerous occurrence. It was hoped that the outcome of this research would answer basic questions about the techniques taught to thousands of future blind travelers and help them maintain their orientation and safety.

Results from this study were hoped to add significantly to the literature of the orientation and mobility profession and would enhance the reputation of the UALR program and faculty, and the scientists at the VA Further, results from this study would impact on the curriculum of the orientation and mobility programs throughout the country and in other countries, as well, in the manner in which blindfold simulations are taught to the students; and, in terms of how mobility specialists presented the teaching of cane techniques to clients and students at agencies, VA's, and schools for the blind around the U.S.

Method

The research design was fairly simple and straight forward. Thirty- one sighted students from five orientation and mobility pre-service university programs served as the subjects for this investigation. Students were blindfolded and asked to walk a straight line route indoors for two separate trials: once while using the new technique (described later) and once while using the traditionally taught method of swinging the long cane, the two point touch technique. This tech-

nique is taught as follows: while holding their canes in their dominant hands at midline to their bodies and at waist height, blindfolded students swing the canes laterally from side-to-side, touching the cane tips down onto the ground opposite each foot. As each walks forward, the cane tip touches down in front of the trailing foot such that the cane previews where the next foot placement will be. As the cane is swung from side-to-side, the hand is kept at midline so that only the wrist actually moves in extension, hyperextension, and flexion. (In actuality, this gross motor movement is quite difficult to accomplish and to self-monitor, and requires continuous feedback from the instructor.) If the student does not master the skill, the cane-held hand most often drifts away from midline toward the dominant side of the body (Hill & Ponder, 1976; Jacobson, 1993).
It has long been believed that the student would veer in the direction of the hand drift (Jacobson, 1993).

All subjects learned a new method of grasping and swinging the cane, the fingertip two point touch cane technique, designed to promote hand stability, thus reducing hand drift and potential veering (Jacobson, 1993): subjects grasped their canes with just the fingertips of the cane hands while their elbows were bent and braced against the side of their rib cage; the canes were "swung" by flexing and extending the index finger, thus eliminating the movement of the entire hand and wrist. After treatrnent@ these subjects were videotaped using both techniques; the order of which technique was used initially was assigned randomly.

Subjects walked a 50 foot I-shaped route (one with no turns) indoors in which a 4.0 foot area on the floor represented the typical width of a residential sidewalk. Subjects were kept on course by ropes on either side of them: the ropes were threaded through 8 inch high t-bars positioned every ten feet and screwed into lOx12 inch blocks of wood; these served as the route stations. Masking tape was applied to the floor across the width of the route and at each station so that measurements could be taken at ten foot increments. Vertical stripes were placed on each tape at one foot increments in order to measure veering at each station. Subjects were videotaped walking the route on two separate trials.

The subjects wore a specially-designed belt that enabled the researchers to measure hand-centeredness and stability while maneuvering the-cane using either technique: a rectangular card was positioned at midline on the belt with vertical stripes at one inch increments in order to measure the position of the cane-held hand at each route station.

Analysis

A videotaped analysis of the two trials would determine if the treatment had an effect on hand-centeredness and veering by: counting the number of times the cane or body contacted the ropes along the route (in the ten foot increments), and the percentage of time the cane/body touched the rope versus the percentage of time the subjects stayed within the roped area of the route. Subjects were rated on a Likert-type scale to measure veering (l -4 feet) and hand stability (1-4 inches).

Variables: The independent variable was the type of hand grasp and swing for the cane technique (traditional versus fingertip). Dependent variables were hand centerdness (as defined by the root mean square of deviations from center position measured at ten foot intervals), hand-bias (as defined by the signed average deviation from center position with right considered positive and left considered negative, and veer (as defined by the number of times the roped boundaries are contacted in a trial with the right boundary counted as positive and the left boundary counted as negatives).

Hypothesis 1: Hand-Centeredness helps ensure a straight line of travel for individuals with visual impairments. A Pearson's product moment correlation was used to examine the relationship between the independent variable of hand-bias and the dependent variable, veer-bias. Statistically, there were no significant differences in hand centeredness and veering in the preliminary analysis. It has been postulated by the researchers that some of these students had not yet learned how to correct from a veer, which is a standard teaching practice. Had they learned this skill, a more natural correction would enable veer measurement rather than the pinballing effect that occurred with most subjects. Further analyses will look at the differences between more seasoned travelers (the PCO and PM students) and the neophyte travelers (the other groups of students).

Hypothesis 2: The fingertip method helps ensure hand centeredness better than the traditional method. A dependent t-test with the type of cane grasp as the independent variable was used to test for differences- in the dependent variable, hand-centeredness. Once again, statistically there were no significant differences between techniques. However, further analysis may show that the new, fingertip method, was equal to the traditional method of swinging the cane and should be considered as a viable option for some learners. In any case, the current study shows that with minimal training subjects can keep their cane hands within acceptable parameters of midline. In any event, it only took approximately 20 minutes to teach an entire group of students how to effectively use the fingertip method of cane grasp and swing. This in and of itself might encourage the use of this technique in comparison to the traditional method, which takes a significant number of hours to teach and learn.

Hypothesis 3: The fingertip method ensures a straight line of travel better than the traditional method. A dependent t-test with type of cane grasp as the independent variable was used to test for differences in the dependent variable, veer. Statistically, there were no significant differences between techniques. It may be inferred, therefore, that either technique is equal to the other in terms of straight line of travel, once again indicating the viability of the new technique in comparison to the more accepted procedure for swinging the cane.

More detailed and precise analyses may answer some of the research questions and better answer the hypotheses. While the statistical results were not so encouraging initially, they did help to answer some underlying assumptions held by orientation and mobility specialists throughout the years. The results, however preliminary, may lead to further studies by the researchers in the next several years.

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A BIOMECHANICAL EVALUATION OF VISUALLY IMPAIRED PERSONS' GAIT

VINCENT K. RAMSEY
Veterans Administration Medical Center
Department of Rehabilitation Research and Development
1670 Clairmont Road
Atlanta, Georgia 30033
Ph: 404 321-6111 x 6235
Fax: 404 728-4837

Objectives:
The purpose of this study was to compare gait and long cane mechanics between groups of visually impaired mobility trained subjects during normal and multi-tasked walking.

Introduction:
Human gait analysis has, for many years, been at the center of numerous biomechanical research studies. Gait velocity, stride lengths, stride rates and other related joint angle parameters are variables that are most often examined when studying walking patterns. However, the vast majority of gait research has been performed only on a sighted population. These studies have included analyses of normal gait of varying age groups, abnormal gait due to injury or disease, and gait patterns with respect to gender. Few studies have investigated the gait cycle in the visually impaired population, which numbers over two million in the United States alone. Biomechanical research that has been conducted within this population has focused on gait velocity, stride rate, stride length and long-cane techniques with regard to orientation and mobility training (Clark-Carter, Heyes, & Howarth, 1986; Johnson, Johnson, Blasch, & De l'Aune, 1996).

Limited measures of postural stability and balance have also been recorded for visually impaired subjects. Elliott, Patla, Flanagan, Spaulding, Rietdyk, Strong, and Brown (1995) found significant differences in balance and postural parameters between sighted and visually impaired groups. Adding an attention-demanding task to the testing protocol further degraded the scores for each group. These data indicate the increased risk involved with balance maintenance while attending to an external stimulus. This risk factor is further compounded for the visually impaired traveler who must be cognizant of obstacles in the path of travel while maintaining awareness of audible cues.

A better understanding of the physical challenges faced by the visually impaired population is needed in order to improve the mobility and independence of this group of people. Research indicates that mobility is strongly correlated with self -perceived physical performance (Cress, Schechtman, Mulrow, Fiatrone, Gerety, & Buchner, 1995). Analyzing and evaluating the gait of visually impaired subjects may lead to refinements in orientation and mobility training, thereby providing a significant increase in the performance of activities of daily living (ADL's). Possible improvements could be made in the amount of path coverage and preview time a

mobility traveler has while walking. A deficiency in either component could decrease the ability to detect a path obstacle which could lead to a fall and injury. Quantitative analyses of joint angle range of motion and angular velocity combined with assessment of gait velocity, stride length, stride rate and long-cane techniques could prove beneficial in determining the dynamic effects that vision loss manifests on a normal human gait cycle.

Method:
Twenty subjects mean age 50.32 ± 18.36 years participated in this study. Ten reflective markers were placed on each subject at predetermined joint locations and tracked through a calibrated space using a three camera Motion Analysis Corporation videography system. Twelve dependent variables of gait and long cane mechanics were measured and analyzed. Subjects were grouped into Good or Bad categories based on their long cane techniques. Grouping designations were determined by a three person panel of orientation and mobility experts who independently examined videotape of each subject during normal walking. Subjects were required to perform seven walking trials consisting of normal walking, walking while reacting to a simulated drop-off, walking while responding to an audible secondary task, and walking while reacting to a simulated drop-off while responding to an audible secondary task. A prototype retractable cane was designed to simulate the tactile sensation of detecting a drop-off such as a curb or hole.

The cane was constructed from two pieces of hollow graphite tubing totaling fifty-six inches in length. Normal long-cane length is determined by the approximate height from the ground to the sternum. Ninety-eight percent of visually impaired veterans are males whose average height ranges from 68-71 inches, therefore it was the decision of the research team to design and build a prototype retractable cane that would best include this population sample. The cane tip section was designed to reduce the overall cane length approximately six inches through the use of an elastic cord and triggering mechanism. After each retraction the cane could be reset to 56 inches by pulling the overlapping sections apart. A system of small servo-motors, cable, radio-frequency receiver and latch mechanism was attached to the cane tubing to achieve the desired operation. Retraction was initiated by activating a hand-held radio-frequency transmitter some time during the gait cycle. Data were analyzed using a repeated measures analysis of variance (RANOVA) and Pearson's r correlation coefficient at a significance level of $p \leq .05$.

Results and Conclusion:
No significant differences were found between the groups of Good and Bad travelers for the dependent variables examined. However, significant differences were found within groups by trial for components of hip flexion velocity, gait velocity, and stride length. These data indicate a significant alteration in the normal walking pattern of visually impaired persons when faced with multi-tasking situations. A decrease in both gait velocity and stride length were noted during trials requiring subjects to respond to an audible tone. Hip flexion velocity proved to be the most varied component with significant differences being found between all trial combinations.

These values indicate a wide range of responses from the subjects when faced with multi-tasked environments. Subjects were seen to "high step" or "shuffle step" during the tasked tri-

als which caused the hip flexion velocity values to be greatly varied. Results from this study indicate a potentially dangerous modification in the gait cycle of visually impaired travelers when faced with multiple somato-sensory inputs. These kinetic alterations could adversely affect the balance of this population during daily travel. Attention demanding tasks placed on visually impaired travelers during normal walking could decrease their ability to maintain spatial awareness and detect path obstacles thereby increasing the risk potential for falls and injury.

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CLINICAL EVALUATION OF FAST-DARKENING SUNWEAR FOR PEOPLE WITH LOW VISION

DAVID A. ROSS, M.S.E.E., M.ED.
Atlanta VA Rehab. R&D Center
Atlanta VA Medical Center, Decatur, Georgia 30033

GARY L. MANCIL, O.D., F.A.A.O.
Vision Rehabilitation Research Laboratory
Salisbury VA Medical Center
Salisbury, NC 28144

Abstract
In this study the visual performance of people with low vision was evaluated under varied ambient lighting conditions while they wore 1) no sunwear, 2) their preferred sunwear, and 3) newly developed Liquid Crystal (LC) sunglasses. Subjects included people with age-related macular degeneration (ARMD), cloudy ocular media, pseudo-aphakia, retinitis pigmentosa (RP), and people without a visual disability. When wearing the LC sunglasses, the subject population as a whole exhibited statistically significant improvement in visual function, with the ARMD subjects exhibiting the most statistically significant improvement in function.

Background

People with ocular diseases such as RP, albinism, aniridia and achromatopsia have extreme problems with varying light conditions and can usually function effectively only under controlled lighting conditions. Other ocular diseases such as ARMD and conditions affecting the ocular media (e.g., cataracts, corneal dystrophy) have varying effects on retinal adaptation [1].

Of these diseases, ARMD is the most common cause of legal blindness in the United States in persons over the age of 60; and its prevalence increases significantly after age 65 [2]. For these people the problem of light adaptation is related to the atrophy of their cone cells. As the normally sighted person moves from a bright to dimly-lit area, the cone function fades as the rod function adapts to photopic vision. When returning to the bright environment, the adaptation time is shorter as cones begin to function fully in just a few minutes. However, when the cones have atrophied, full adaptation to bright light may be quite slow. For all persons (fully sighted as well as persons with low vision), a fairly narrow range of overall illumination is optimal. Too much or too little light results in dramatic reductions of visual acuity and a corresponding reduction of visual function [3]. However, the unimpaired person has a type of visual reserve (i.e., more acuity, more field of view, more contrast sensitivity, more light/dark adaptation, etc. than the minimum required for most visual tasks) [4] that gives this person the ability to maintain functional performance in less than optimal conditions.

The low vision traveler experiences two primary functional vision problems: detection of changes in terrain (such as curbs), and adapting to changing lighting conditions [5]. In a recent

national survey of low vision consumers and their mobility instructors, “Changing environmental lighting conditions” was considered their most difficult mobility problem [5]. “Drop offs,” down curbs and steps, were reported as second most difficult. In terms of functional mobility, these problems result in reduced travel speed and gait changes [6].

In an attempt to improve the visual function of people with low vision, light-absorbing lenses are often prescribed in a variety of styles, colors, and amount of light absorption. However, in order to adapt to a variety of ambient conditions, a person may need to employ a range of absorptive tints and to change back and forth among them as lighting conditions change—a rather cumbersome process [7]. Photo-darkening lens coatings are not currently used for this purpose because they are slow to lighten when going from bright sunlight into shadow—a particularly hazardous situation. Further, because these coatings are sensitive only to ultra-violet light, they do not respond to changing lighting conditions indoors or inside a closed automobile.

Research Question

Does the visual function of people with low vision improve when sunwear is worn that darkens and lightens quickly with changes in ambient lighting? Specifically, do acuity, contrast sensitivity, and functional mobility improve when LC sunglasses are worn versus available sunwear selected as “prefered” by each subject?

Figure 1. LC Sunglasses with polarizing filters shown flipped up for indoor use.

Method

Employing a flip-up polarizer, the LC glasses tested by subjects (Fig. 1) provided an indoor light/dark range of 32% to 63% light absorption (polarizer flipped up) and an outdoor range of 77% to 98% light absorption (polarizer flipped down). A photosensor on the inside of each LC lens provided feedback to a control circuit that darkened each lens in proportion to the amount of light passing through the lens. Time to fully darken was approximately 30 milliseconds. The

lenses were adjusted to begin darkening when the amount of light passing through to the user's eyes reached 500 lumens, and to become fully darkened when the amount of light passing through reached 2000 lumens, regardless of the polarizer position. This adjustment corresponded to an indoor ambient light range of 735 lumens (typical office lighting) to 5400 lumens (light near windows on a bright day) and an outdoor ambient light range 2200 lumens (in shade on a moderate day) to 100,000 lumens (light reflected from white concrete on a bright summer day).

Subject selection criteria were as follows:
- Age: 55 to 75
- ARMD: acuity 20/100 to 20/300
- Cloudy Media: acuity 20/40 to 20/300
- Pseudo-aphakia: acuity 20/40 to 20/30
- RP: acuity 20/20 to 20/200
- Normals: acuity 20/40 or better

Subjects were screened for any physical or orthopedic problems that would prevent them from easily walking a test route. They were also given a cognitive test to insure that they could easily follow directions. Subjects were then shown a wide assortment of available sunwear and placed in a room with simulated sunlight conditions to determine which sunwear worked best for them. The sunwear they selected here was then used in all testing protocols described below in side-by-side performance tests with the LC sunglasses.

Clinical testing of acuity and contrast sensitivity was conducted first. This was done under varied lighting conditions employing a BVAT testing system and the Berkeley Glare test. Visual Acuity and Contrast Sensitivity were first measured under normal room lighting conditions. Then, employing the Berkeley glare test, the brightness was increased in a sequence of three brightness options. These tests were all administered in standard sequence. The subjects took this battery of tests while wearing 1) their habitual lens correction only, 2) their preferred sunwear over their corrective lenses, and 3) the LC sunglasses over their corrective lenses. The order in which they tested their "preferred" sunwear and the LC sunglasses was randomized across subjects.

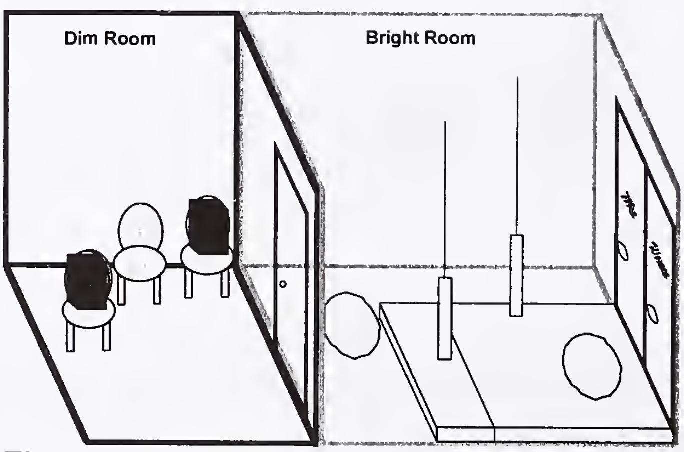

Figure 2. Functional mobility testing rooms.

A mobility test followed the clinical tests. Here the subjects walked from a room with black walls lit by a 40 watt light bulb into a room with simulated sunlight pouring in from above, and white walls (Fig. 2). The subjects walked the length of the brightly-lit room, past obstacles, up a step, and to a restroom door that matched their gender. They then walked from the brightly-lit room into the dimly lit room, located an unoccupied chair, and sat down. Again, subjects performed these tasks 3 times while wearing 1) no sunwear, 2) preferred sunwear, and 3) LC sunglasses. Again, the order in which "preferred" sunwear and LC sunglasses were tested was randomized across subjects. In addition, the location of obstacles, the location of the step, the gender of the restroom doors, and the location of the unoccupied chair was different for each of the three test trials. Performance times were measured and errors (stumbles, bumps) recorded.

Test	Population	N	LC Improvement
Acuity (Logmar) (Normal Lighting)	All Subjects	107	+0.023
	ARMD	23	+0.041
	Cloudy Media	32	+0.034
Contrast Sensitivity (Normal Lighting)	All Subjects	107	+15.5%
	ARMD	23	+27.5%
	Normals	30	+36.1%
Contrast Sensitivity (Low Glare)	All Subjects	107	+10.2%
	Pseudo-aphakia	14	+27.1%
	Normals	30	+20.6%
Mobility (Bright)	Cloudy Media	32	-19.9%
Mobility (Dim)	All Subjects	107	+35.5%
	ARMD	23	+33.9%
	Cloudy Media	32	+19.9%
	Pseudo-aphakia	14	+54.0%
	Normals	30	+38.0%

Table 1. Results showing cases where LC sunglasses were a significant improvement over preferred sunwear.

After completing the performance tests, subjects were asked a number of forced choice questions about their ability to function when using each of the three eyewear options.

Results

A total of 107 subjects were tested, including 23 with ARMD, 32 with cloudy ocular media, 14 with pseudo-aphakia, 8 with retinitis pigmentosa, and 30 normals. Each subject's performance scores with the preferred and LC sunwear was referenced to their base-line score using no sunwear. These baseline-referenced scores for preferred sunwear and LC sunglasses were then compared in the data analyses. Table 1 above lists instances where differences in performance between preferred sunwear and LC sunglasses was statistically significant. Numbers preceded by a "+" sign indicate improved performance with LC sunglasses. Numbers preceded by a "-" sign indicate a degraded performance when LC sunglasses were worn.

Discussion

As can be seen from Table 1, subjects with ARMD showed significant improvements in acuity, contrast sensitivity, and in the mobility task where they moved from a bright space to a dimly-lit space. Surprisingly, no improvement was seen when subjects walked into the brightly-lit

room. Comments from the subjects indicated that the LC glasses darkened too much in the bright room, making the task more difficult. This problem can be easily remedied, however, with a circuit modification that would give the user control over the rate at which the lenses darken with increasing ambient light.

Also of note is the fact that subjects with good vision exhibited considerable improvement as well. This indicates a potential mass market for such LC glasses.

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David A. Ross
Atlanta VA Rehabilitation R&D Center
1670 Clairmont Road (MS 151-R)
Decatur, GA 30033
(404) 321-6111x6817 FAX: (404) 728-4837
E-mail: davidross1@mindspring.com

EFFECT OF ILLUMINANCE ON THE MOBILITY PERFORMANCE OF ADULTS WITH RETINITIS PIGMENTOSA

JAN LOVIE-KITCHIN*, RUSSELL L WOODS# & ALEX BLACK§

* Centre for Eye Research, School of Optometry, Queensland University of Technology, Brisbane, Australia, 4059

Department of Vision Sciences, Glasgow Caledonian University, Glasgow, Scotland;

§ Private practice, Brisbane, Australia

INTRODUCTION

Many people with low, but useable vision have difficulties with independent travel in different situations. Mobility is a complex task, dependent on environmental factors, such as colour, rate of movement, light level and contrast, and personal factors, such as prior mobility training, age, fear of injury, propensity for risk taking and personal knowledge of the environment.[1]

Retinitis pigmentosa (RP) is a slow dystrophic disease which leads to poor night vision and abnormal visual adaptation due to loss of rod and cone function, gradual constriction of the peripheral visual field and reduced peripheral awareness, reduction in central visual field size, and progressive loss of colour discrimination.[2] Commonly reported mobility problems of people with RP have included tripping and falling, difficulty with lighting levels and bumping into people and objects.[3, 4] For this reason, our study investigated the use of residual vision by people with RP for mobility performance, and how one environmental factor, illumination, affects their mobility performance.

Previous studies[1, 5-7] have demonstrated that some vision measures relate to the mobility of subjects with simulated and true low vision, but the relationship between residual vision and mobility is not clear. Based on previous research findings, we predicted that mobility performance would be reduced for those with RP, compared with age-matched controls and would be worse again under reduced illumination. We also hypothesised that visual acuity would not be a significant predictor of mobility performance and that the predictive value of contrast sensitivity and visual field extent would be higher for mobility performance measured under high illumination (similar to that used for these vision measures).

METHODS

Binocular visual acuity, letter contrast sensitivity and average binocular visual field extent (degrees) were measured on 10 subjects with visual impairment due to RP and 9 age-matched control subjects with normal vision. Mobility was assessed by measuring time taken and number of errors on a 57.5m long indoor mobility course, which included 55 obstacles. Each subject walked through the course twice, under high (450 lux) and low (25 lux) illuminances. The order of the two mobility trials was balanced to average out learning effects.

Mobility performance was assessed by Percentage Preferred Walking Speed (PPWS)[8] and error score, calculated as follows: error score = $\log_{10}$ (20 / (1 + number of errors)). Repeated measures analyses of variance (ANOVA) were used to examine the differences in mobility measures between the RP and control groups under the high and low illuminances. The relationships between vision measures and mobility performance of the RP group were examined using multiple regression analyses.

RESULTS

As expected, the RP group showed significantly reduced PPWS and greater numbers of errors (smaller error score) than the control group (Table 1). Reduced illumination further reduced the mobility scores of the RP group and a glare source on one section of the course caused a further decrease in PPWS under low illumination. Multiple regression analyses showed that average visual field extent was the most significant predictor of both high and low illumination mobility performance. Letter contrast sensitivity and visual acuity added to some regression models to account for up to 75% of the variation in mobility performance. Interestingly, inferior visual field loss was just as highly correlated with mobility as was the average visual field extent.

Mobility measures	RP Group		Control Group	
	High Illumination	Low Illumination	High Illumination	Low Illumination
PPWS (%)	47 ± 16	42 ± 15	66 ± 9	65 ± 10
Number of Errors	5.8 ± 6.0	8.8 ± 6.3	0.2 ± 0.4	0.6 ± 1.0
Error Score – $\log_{10}(20/(1+\text{errors}))$	0.63 ± 0.41	0.44 ± 0.42	1.23 ± 0.13	1.17 ± 0.22

Table 1 **Mean and standard deviation of the mobility measures for the RP and control subjects under the high and low illuminations.**

Discussion

As expected, mobility performance was significantly worse for subjects with RP than for the age-matched subjects with normal vision. Unlike the controls subjects, the RP group showed worse mobility performance under low illumination; they made approximately 50% more errors under the low illumination compared with the high illumination.

Visual field extent was the strongest predictor of mobility performance. We measured visual fields with a high background illuminance (300 lux), so we expected its predictive value to be greater for the higher illumination mobility measures than for the low illumination measures, but this was not apparent. These results do not confirm earlier suggestions that measurements of vision should be conducted under the same illuminance as the measurements of mobility to have predictive value.[3, 7]

As found in previous studies of low vision subjects,[1, 5-7] visual field extent and contrast sensitivity predicted mobility performance on our indoor course. These results are important when considering strategies to enhance the mobility of persons with RP, as external factors such as reduced illumination or illumination changes should be taken into account. Hence consideration needs to be given to the design of buildings and shopping centres, with particular consideration being given to lighting, contrast, obstacle placement and terrain variations.

Publication

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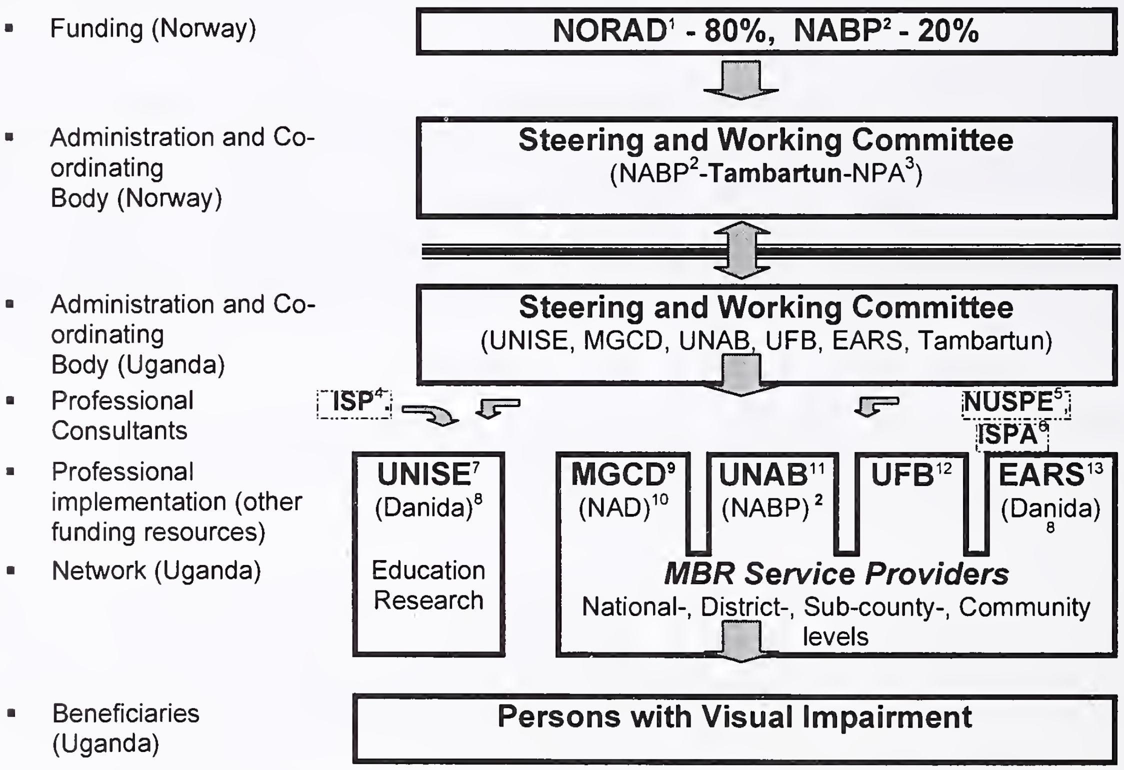
THE MBR PROGRAMME IN UGANDA

BENGT ELMERSKOG, JON MAGNE TELLEVIK, HARALD MARTINSEN, MAGNAR STORLILØKKEN, NAYINDA SENTUMBWE
Tambartun National Resource Centre for The Visually Impaired, 7084 Melhus, Norway
Dep. of Special Education, University of Oslo, Postboks 1140, 0317 Oslo, Norway

I. BACKGROUND AND ORGANISATION

The bilateral aid project "Mobility, Rehabilitation and Habilitation Programme for Persons with Visual Impairment" in Uganda, named as "the MBR-programme", started in 1995 and is expected to end in 2000. It receives 80% and 20% of its funds from Norwegian Agency for Development Co-operation and Norwegian Association of the Blind and Partially Sighted respectively. The following flowchart illustrates the organisation model of the project:

Figure 1: Organisation model of the MBR programme



[1] Norwegian Agency for Development Co-operation
[2] Norwegian Association of the Blind and Partially Sighted
[3] Norwegian People's Aid
[4] Institute of Special Education - University of Oslo, Norway
[5] Norwegian University of Sports and Physical Education, Oslo
[6] International Blind Sports Association
[7] Uganda National Institute of Special Education
[8] Danish Agency for International Development Assistance
[9] Ministry of Gender and Community Development
[10] Norwegian Association of the Disabled
[11] Uganda National Association of the Blind
[12] Uganda Foundation for the Blind
[13] Education Assessment and Rehabilitation Services - Special Needs Education

The project is, on the Norwegian side, a joint venture between Tambartun National Resource Centre for the Visual Impaired, Norwegian Association of the Blind and Partially Sighted and Norwegian People's Aid. Institute of Special Education in Oslo, Norwegian University of Sports and Physical Education (NUSPE) and International Blind Sports Association (IBSA) are other associate European partners of the project.

Project activities started as a result of contacts with three Governmental Bodies and two Non-Government Organisations in Uganda. These are: Uganda National Institute of Special Education (UNISE), Ministry of Gender and Community Development (MGCD), Education Assessment and Rehabilitation Services - Special Needs Education (EARS-SNE), Uganda National Association of the Blind (UNAB) and Uganda Foundation for the Blind (UFB).

The project directions and directives were set during a seminar in Kampala in August, 1995. Ugandan Steering and Working Committees were appointed during the seminar. These committees consist of representatives from the five organisations mentioned earlier. The important reasons for having these Committees were to ensure collaboration, to secure and confirm that decisions taken are in line with and under respectively organisation's or authority's policy and control. Two important directives of the MBR programme were set during the seminar. First, the programme was to be adapted and employed to suit the local culture. The tasks, in which individuals were to perform, were to reflect cultural conditions and requirements of the people with visual impairment. Secondly, it was important that the programme should be accomplished within existing governmental and non-governmental structures in Uganda. The programme was therefore given both an individual-oriented and a system-oriented approach.

The project was defined and divided into three main phases. Phase 1 (1995-96) was defined in terms of the necessary preparatory work. Phase 2 (1996-97) was defined in terms of training of trainers and trying out working methods. Phase 3 (1998-2000) was defined in terms of building up a viable and sustainable programme after the termination of the project.

II. WORKING METHOD

A working method has been developed in collaboration between the Norwegian and Uganda partners in order to attain a holistic and action-oriented approach. The method, which is based on a step-by-step procedure, is shown in figure 2.

Figure 2. Flowchart of the working method

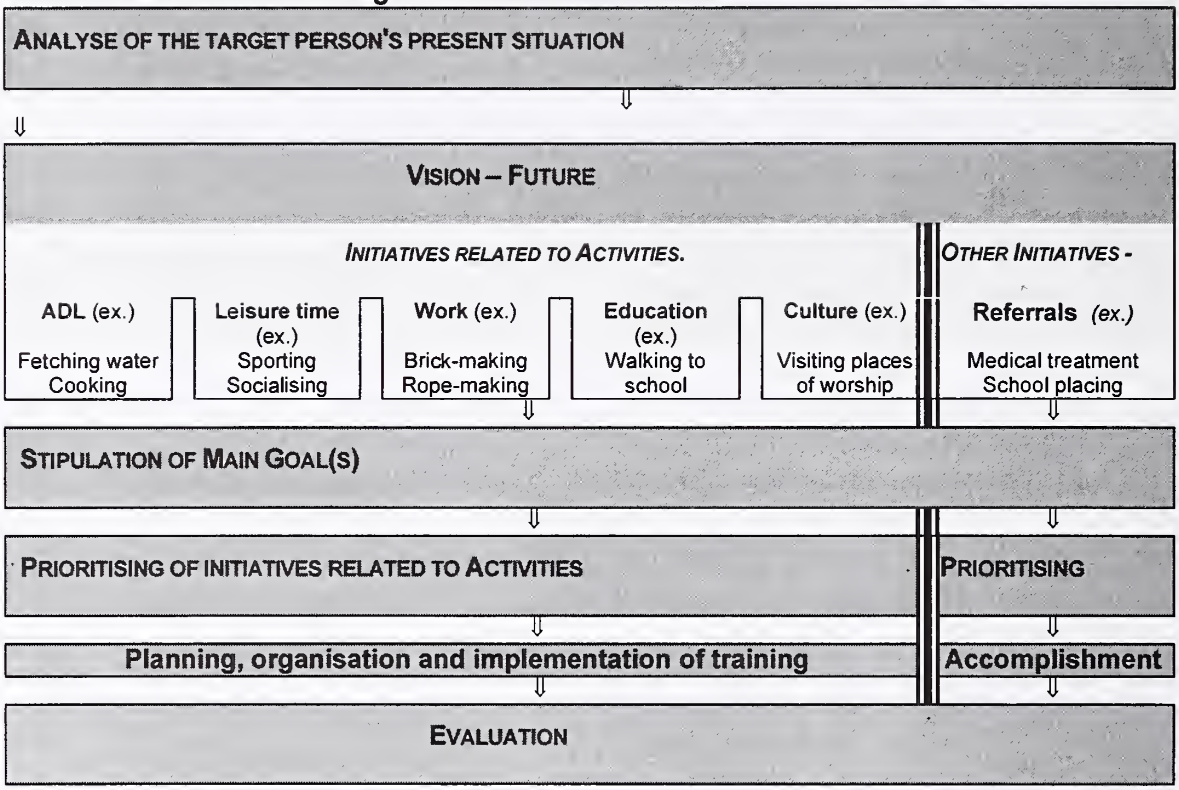


Figure 2 gives a picture of how the procedures in the programme are structured in relation to principal tasks or themes. The working tasks are specified on four different forms. I will briefly describe what the outlined tasks or steps will involve:

1. Analyse of present situation

In order to work toward individual long term MBR goals, it is necessary to map out the present life situation of the individual with visual impairment. It is, among others, required to find out what activities the target person participates in. Five main areas of activities are in most cases considered. These are; activities of daily living (ADL), leisure time and play-related activities, culture-related activities, occupation/work-related activities and education-related activities. The target person's performance on identified activities are assessed one by one where we focus on areas such as individual skills, degree of independence, O&M performance.

It is to be assumed that a satisfactory life situation requires a reasonable balance between mentioned activity areas. However, the mapping often shows that participation in some areas of activities is predominant. This concerns mainly ADL-activities. People with visual impairment in Uganda, who lose their sight as adults, are often self-reliant in these activities. The main problems for this group of people is often found within other areas of activities or life arenas, which often results in little contact with other people or unclear roles within the family or society.

The situation for children with visual impairment is different. Children have, in many cases, no experience in participating in activities which other children are performing daily such as playing, participating in Sports, or to performing family duties like fetching water. The independence level in ADL activities is normally low.

The mapping also includes gathering of information related to health, personal hygiene, economy, social situation etc., which might indicate needs for future MBR-initiatives.

2. Description of a desirable future - vision.

Next step is to describe a vision of a better future for the target person. This implies that we, in collaboration with the target person and his or her social network, set up a vision, based on the information which was gathered during the mapping. The vision must be based on a realistic feasibility of a better future, where we, in particular, focus on participation in activities which normally take place in the target person's home environment. If the identified activities are insufficient to obtain personal goals, new activities must be planned and made available for the person with visually impairment. A reasonable balance between five earlier mentioned activity areas should be considered.

3. Defining main goals on the basis of mapping and future visions

The mapping and the future vision will give us 2 different pictures. The difference between these pictures is the basic framework when defining main goals for future MBR work. Main goals are defined according to the five main activity areas mentioned previously, and may be characterised as general objective associated with development, health and social integration.

4. Prioritising activities, training goals and other initiatives

A range of needs, wishes and suggestions for action-oriented initiatives always come forth in connection with the process of the mapping and the description of a better future. It is, in most cases, necessary to prioritise the proposed initiatives on two levels; "initiatives related to activities" and "other initiatives".

Prioritised "initiatives related to activities" might imply that new activities are inducted into the target person's life. Or it could mean to carry out independence training in activities which the individual already participates in. Prioritising of "other initiatives" could be school-placing, medical care or others. This normally implies referrals to requisite body which handle such matters.

5. Planning, organising and implementing chosen initiatives.

Prioritised activities are to be prepared for training or other prospective initiatives. Preparation of the training includes making task analyses of chosen activities, establishment of mobility routes necessary to reach the activities etc., in order to obtain structured teaching and learning situations. The training is normally accomplished in home environment, where participation from "sighted helpers" from the target person's social network is needed. It is of crucial importance that these "helpers" are given requisite competence and motivation, in order to enable them to carry out the daily training.

Initiatives may also be linked to providing opportunities to participate in activities which don't require training exercises. This in order to ensure participation in public or cultural activities such as going to places of worship, the market, the local pub or local elections.

Priorities of "other initiatives" may at times require referrals to professionals within health or education. It is the MBR instructor's duty to ensure that such referrals are made.

6. Evaluation.

Evaluation of the work is important in order to detect necessary adjustments of goals, training and initiatives. These evaluations are carried out continuously and give an analytical perspective of the progress. Evaluation is done on different levels, from holistic perspectives to training details.

III. MIDTERM EXPERIENCES AND SUMMARY

To summarise and evaluate the programme at this juncture, we start with the number of people with visual impairment who have been involved in the MBR programme. The first group of twelve MBR instructors has now been at work in their districts, ministries and respective organisations for a year. Between 400 and 500 people with visual impairment have been registered in the operational area of these instructors.

Almost all beneficiaries have been identified by the Uganda Working Committee and partner organisations. A number of people with visual impairment of different ages have been fitted with eye-glasses or operated on. Many children have been placed at school and many partially-sighted individuals have had their eyes diagnosed and treated. Mobility routes have been defined for children in school, necessary physical adaptation made and relevant mobility training been given. Many adults have been trained in occupational or home based working activities.

MBR programmes today are represented in 13 out of 44 districts. In connection with the training at UNISE the curriculum and syllabus have been set and approved, the training has been established and integrated into UNISE programmes, and educational and training materials have been produced. Talks are also initiated to offer MBR training for students from other countries of East Africa. 24 students have, so far, concluded a one year long MBR course successfully at UNISE. Another lot of students will enter this course in October. Around 100 students in other courses at UNISE have been taught the basics of MBR. The MBR courses at UNISE are today 100% self-reliant. Two former MBR students are running the training without any academic support from Norway. One of these students will later this year enter Master Education in Norway.

Through its CBR programme, the Ministry of Gender is educating their personnel, working on community level in MBR. It is expected that MBR will be introduced to 60 employees during 1998, who will later serve approximately 200 to 300 people with visual impairment. The Ministry of Gender has, in addition, sensitised a number of officials on district- and local levels.

EARS-SNE is introducing and integrating MBR activities in their school programmes. EARS has, so far, trained 60 teachers in three districts in MBR. These teachers are responsible for teaching children who are integrated in "normal" schools.

UNAB has undertaken the task of starting MBR activities in two districts where the CBR-programme is not represented. UNAB has, so far, identified 300 people with visual impairment and given one MBR-course for 10 local officials employed by The Ministry of Gender. Each participant in this course is during 1998 expected to initiate MBR-initiatives for 8 people with visual impairment. UNAB is, in addition, running courses in various income-generating activities for persons referred by other programmes partners.

We have experienced a change in attitudes toward the programme both on local and central levels. The programme's practical character and focus upon meaningful activities are of greatest appeal. For people with visual impairment, the focus on functional activities is of crucial importance, because quick and tangible results positively influence the life situation.

Another important aspect of the programme relates to three sub-projects:

- ***Braille production:*** Production of Braille material will contribute toward covering the great need for scholastic materials like textbooks. This enterprise is in collaboration with Danida, which is responsible for Danish development aid interests in Uganda.
- ***White Cane production:*** Tests of low cost aluminium, plastic and light-wood canes which were produced locally, have been carried out in different parts of the country. Emphasis has particularly been put on the production of the light-wood cane which can be made by local craftsmen out of materials available in the community and distributed by personnel of the programme's network.
- ***Sports:*** Introduction of Sports and physical activities aims at creating a pioneer group of "blind sports" and "physical education" instructors who will initiate activities at schools and among people with visual impairment throughout the country. An estimated number of 200 children and youths and 14 physical education teachers from 6 different districts are during 1998 expected to be involved in the Sports activities.

We hope that this presentation of the Uganda MBR Programme puts in clear perspective the basic concept, goals, scope and operational mode of the project. Goals for the future are ambitious and focus on the strengthening and development of on-going activities. On the basis of the experiences we have made hitherto, we have cause for optimism with regard to the future, and its ultimate goal of improving the life situation for people with visual impairment in Uganda. Thank You.

ANALYSIS OF THE MOBILITY AND REHABILITATION PROGRAMME IN UGANDA

FRANCIS KINUBI
Uganda National Association of the Blind
P. 0. Box 6938, Kampala - Uganda

Uganda National Association of the Blind is a Non-Governmental Organisation of the blind in Uganda. Its main mission is to advocate for the equalisation of rights and opportunities for all the blind persons in this country. It also endeavours to deliver services to the most needy persons with visual impairment whenever it comes across any support especially education for children and programmes catering for blind women so as to improve their welfare. It also acts or provides consultancy services to all who want to know any thing about the blind persons in Uganda since they as blind people know where their colleagues are, what they do and problems they face.

Since UNAB acts as a hunting dog for the blind persons in Uganda, it identified or came to learn that there is a programme catering for training blind persons in Mobility skills and rehabilitating those who needed skills in activities of daily living and the like. Having learnt about it in 1994, it invited the concerned people from Norway who agreed to come and identify and assess the possibilities of its work in Uganda. I admit that not all the blind in Uganda first supported the programme at its initial stages because they misunderstood what it was intended for, whom it would involve in its implementation and who was to benefit from it. However, some of us who were among those who attended its first meetings had seen the vision of the programme and were satisfied with its objectives. We therefore, tried our level best to have UNAB membership who are blind themselves to buy it and embrace it wholeheartedly which they did. In the long run, after the programme had taken root, those who had misinterpreted its good intentions, are now pleased because it has covered very many blind people especially in the rural areas where a lot of rehabilitation is now being carried out. It is addressing all kinds of people like those who went blind at their adult age, children who have been ignored by their own parents, society and the whole public due to cultural beliefs which are still followed in all areas of Uganda.

Among the many problems blind persons have in Uganda is lack of Mobility skills. I think that this is also the same in all developing countries especially Africa where infrastructure is poor or non-existent like good roads, modern means of transport which can enable one move from place to place independently or with very little assistance. Poorly planned physical structures like houses, drainage systems and many others. Blind persons in developed countries have gone far in acquiring better aids in all those fields especially mobility and independent living by acquiring modern technology. On that point, I would like to acknowledge the efforts of scientists and engineers who are working around the clock and ensure that such machines and better methods of having blind people live independently. The convening of such conferences like the International Mobility Conference is in its self a big achievement since it brings together all stakeholders in the struggle to find the problems still disabling persons with visual impair-

ment. The only difficulty or obstacle is how to have them reach poor nations like Uganda where it is still a dream.

I hope that the deliberations in such Conferences will try to address that problem of finding ways of availing such aids in mobility, reading and others which can enable a blind person live independently that if we want to make this world a better place to live in for everyone regardless of abilities or disabilities.

The implementers of the Mobility and Rehabilitation Programme in Uganda know how many blind persons have so far benefited from it and the coverage in terms of area but as advocates of the blind, we have also monitored their performance and the progress so far attained by evaluating the work so far done in the two years the programme has spent in Uganda and have recognised it as significant and beneficial. Honestly speaking, if there is any other programme which has catered and addressed the needs of the local persons with visual impairment in the rural areas in Uganda, it is Mobility and Rehabilitation Programme no and no other at least for now. Yes, several others have covered prevention of blindness, education for the children with visual impairment and the like but what about those who can't go to school? Those who have become blind after prevention has failed? In order for them to survive and be happy, skills in mobility are necessary and so the programme has saved much.

However, a lot of work is still ahead of those implementing it. More manpower is needed. Training of instructors to cover the whole country is still a pre-requisite. Many districts are not yet covered. More resources are needed in terms of transport which can enable them reach the most rural areas of this country. Mobility aids like white canes are still scarce and the blind nowadays ask themselves that "yes, we have been trained but what next?" Therefore, equipment like farm tools since agriculture is the backbone of Uganda and the area in which most blind people depend on, need to be provided as a package for settling them comfortably after training and capital for setting them off in raising their income. It will be a catastrophe to train them and abandon them unsupported. Most of them who could not leave their compounds due to their relatives overprotecting them whereby they only confined them at home can now move independently, visit friends, attend meetings in the village, go for prayers, go to school and so on. With that ability but no support, a thing that their parents can not do, in poor situation that their parents also live in, as the implementers of that programme have also realised, is in itself an obstacle which might lead to further frustration of another grade. Another problem is the number of blind people not yet covered as I have already mentioned. The programme has created a lot of awareness to both the general public and the blind persons in particular such that, those who have not yet benefited are anxiously waiting and so the continuity or sustainability of the programme when the donors withdraw by the year 2,000 is worrying. The planners and Implementers of this programme therefore have to look ahead and query themselves "that what will happen on that day?" As much as our Ugandan Government might try to come in by that time, since in the implementation they were not bypassed, it might not be able to afford handling the bulky work still remaining.

We should remember that, the sleeping giant was awakened, therefore, meeting its needs will soon be the problem. If not, we might end up having more blind people in the streets begging than ever.

Its unfortunate that more and more people in Uganda are becoming blind due to ignorance, treatment because of poverty whereby individuals can't meet the high expenses of medical care and many other reasons. In a population of about 20,000,000, approximately 500,000 are blind. Therefore, the work so far done by the Mobility and Rehabilitation Programme is just a drop in the ocean. Those whom education has catered for are just a handful and so the majority are neglected by their relatives due to lack of awareness or poverty which can't allow them meet the needs of their blind children.

Conclusively, on behalf of the blind in Uganda, I would like to take this opportunity to extend their appreciation and thanks to the initiators of that programme, its funders, from Norway, the trainers of the Instructors who are presently moving all over the village of Uganda and other stakeholders and we pray that they get courage and add more efforts because work is still enormous for we as UNAB are sure that they have met many problems which they should continue endeavouring to overcome. The saying that "Rome was not built in one day" is a reality. We are sure that we as the blind in Uganda shall harvest good fruits because of their sweat. We only appeal to other people interested in the welfare of the development of the blind who are among the many vulnerable groups to lend a hand and support them.

FOCUSSING ON AUTHENTIC, ECOLOGICAL VALID ACTIVITIES IN MOBILITY TRAINING, THE UGANDAN EXPERIENCE

JON MAGNE TELLEVIK, BENGT ELMERSKOG, MAGNAR STORLILØKKEN
Tambartun National Resource Centre for Special Education of the visually impaired
Melhus, Norway,
Department of Special Education, University of Oslo, Norway

INTRODUCTION

Human spatial movement usually takes place for some particular purpose, is deliberate, and often associated with solving a problem. Mobility and orientation skills are in this respect functional for reaching desired goals. Such goals are often associated with activities related to challenges met in everyday life, i.e. activities that are authentic, or ecological valid, for the individual. Focusing on ecological valid activities were basic for the Mobility and Rehabilitation Programme in Uganda. This programme is a joint Ugandan-Norwegian venture in relation to working with visually impaired persons in Uganda. The present paper describes how ecological valid activities may be used in mobility training.

In order to plan and design for future training it is mandatory to map what persons with visual impairment are doing. A main issue in the Mobility and Rehabilitation Programme is therefore to map what kinds of daily life activities persons with visual impairment participate in, and to suggest which future activities persons with visual impairment should be involved in. A major prerequisite in the programme is therefore an analysis of the present situation. This analysis primarily includes a mapping of current activities within different spheres of activity, and the dependence on others in relation to these activities. An analysis of the present situation is basic for discussing visions for the future, stipulation of main goals, prioritising of initiatives related to activities, and planning, designing and implementation of training. An overview of the working procedure in the Mobility and Rehabilitation Programme in Uganda is given in the flowchart in figure 1.

BASIC INFORMATION ABOUT THE PARTICIPANTS IN THE STUDY

The persons attended to in the Mobility and Rehabilitation Programme came from rural areas within three south-east districts in Uganda. In the present study 63 adult persons, all above the age of 18, were selected from a sample of 80 persons with visual impairment attended to in the programme. In this sample there were 42 males and 21 females, 44 were considered to be blind and 19 partially sighted. Many persons had families and children, 36 were married and 27 were single, being either unmarried, divorced or a widow(er).

Figure 1. Flowchart of the working procedure in MBR

ANALYSIS OF PRESENT SITUATION

VISIONS FOR THE FUTURE

SPHERES OF ACTIVITY					*OTHER*
ADL Activities	**Leisure time activities**	**Work activities**	**Educational Activities**	**Cultural Activities**	***Referrals***
Eating Cooking	Sport Fishing	Sowing Soap-making	Doing homework	Participation in Action Theatre	Medical treatment Adult education
Cleaning Fetching water	Socialising with friends	Rope-making Brick-making	Participating in Ph. Education	Role playing Dancing	School placement Mobilising support
Dressing Washing up	Visiting the pub	Selling vegetables	Attending a course	Attending church	Visual diagnostics Adaptation of ph.
Shopping	Play	Transporting products to market	Walking to school	Singing	environment

STIPULATION OF MAIN GOAL(S)

PRIORITISING OF INITIATIVES RELATED TO ACTIVITIES | **PRIORITISING OF INITIATIVES**

Planning, designing and implementation of training | **Implementation of initiatives**

EVALUATION AND ADJUSTMENTS OF GOALS, TRAINING AND INITIATIVES

Several persons (N=23) said they had no occupation. Since it is often assumed that visually impairment, particularly blindness, restricts the ability to participate in regular or random work task, many Ugandans do not get a proper opportunity to work for their livelihood. They instead become social and economic dependent of relatives and friends. The Ugandan society, however, may offer opportunities for visually impaired persons that are not easily found in more industrialised societies.

Most persons having an occupation reported being a peasant (N=40). With its kind of climate and pattern of habitation, Uganda is generally well suited for agricultural activity. Such activity is the mainstay of the economy, and many of the visually impaired persons we met lived in rural areas were the opportunity to work for their livelihood was often associated with agricultural activity one way or the other.

Many of the visually impaired persons in the study, whether they had an occupation or not, did not satisfactory cope with the challenges met in daily life. The situation we often faced concerned an adult person becoming blind at a later age, being inactive, lacking social contact, and feeling depressed because he/she was not able to participate in different kinds of activities formerly attended to.

Very few had received any professional help, guidance or training, and the local community was generally in great need of information on visual impairment and how to help these persons. A significant observation in this study was that although many of the persons attended to were relatively old and being visually impaired for some time, they were usually not registered as visually handicapped before. Table 1 shows the mean chronological age, mean age when visually handicapped, and mean age when first registered, for blind and partially sighted persons in this study.

Table 1. Mean chronological age, age when visually handicapped and age when first registered for blind and partially sighted.

		Chronological age		Age when visually handicapped		Age when first registered	
Visual impairment	N	Mean	SD	Mean	SD	Mean	SD
Blind	44	49.0	18.02	25.8	20.91	48.9	17.97
Partially sighted	19	52.8	17.14	32.2	28.84	52.8	17.14

CURRENT ACTIVITIES AND DEPENDENCE ON OTHERS

Mobility is involved in mostly all daily-life activities. The lack of functional mobility skills intertwined with passivity and dependence on others, are common problems among visually impaired persons. As mentioned above it is mandatory to map the kinds of activities that con-

stitute the daily life of the visually impaired person in order to plan and design for future involvement and training. In order to plan for the future an analysis of the present situation must include information on current activities, and to what extent the visually impaired person is self-sufficient or dependent on others in relation to these activities. The frequencies and percentages of dependence on others for current activities in different spheres of activity are shown in table 2.

Table 2. Frequencies and percentages of dependence on others in current activities in different spheres of activity.

		Dependence on others			
		Independent		Dependent	
Spheres of activity	N	N	Percent	N	Percent
ADL-activities	530	460	86.8	70	13.2
Work activities	102	70	68.6	32	31.4
School activities	2	2	100.0	0	0
Leisure time activities	124	104	83.8	20	16.2
Cultural activities	66	31	47.0	35	53.0

When looking at current activities the visually impaired persons seem generally not to engage in many activities that require travel and mobility skills. Many of the current activities were ADL-activities. Most ADL-activities reported were associated with eating, dressing and personal care, or with cooking and preparing meals, and keeping the house and compound clean and tidy. As shown in table 2 the visually impaired persons were reported to be mainly independent in relation to these activities. Dependence on others was reported in ADL-activities that required some travel and mobility skills, like going to the toilet.

A similar picture appears when considering the other spheres of activity. The visually impaired persons were dependent on others mainly when some travel and mobility skills were required. This is clearly demonstrated when cultural activities were considered. The visually impaired persons in this study were dependent in more than 50% of the current cultural activities. Most cultural activities reported were associated with going to church or prayers (75 %), attending funerals (15 %), or attending meetings and entertainment events (10 %).

Work activities, like cultural activities, generally require mobility skills and initiative to travel. Even though current work activities were relatively few and mainly associated with activities performed not far from home, like gardening, many visually impaired persons were facing problems with such activities. As shown in table 2 persons with visual impairment were reported to be dependent on others in more than 30% of these activities.

The high percentage of independence when leisure time activities were considered may indicate self-sufficiency in travel in activities of this kind. However, since incidence, not time allocated, were recorded the figures in table 2 might give a wrong impression. Although many of the leisure time activities reported were associated with travel, like visiting friends, relatives,

neighbours, and different kinds of social gatherings, many persons with visual impairment were rather passive for longer periods of time in daily life. If we consider the leisure time activities reported in the study, almost 50% of them were associated with «resting», «sitting» or talking to family members.

CURRENT AND FUTURE ACTIVITIES

An overview of current and future activities, and the priorities related to new future activities suggested, are given below. The frequencies and percentages of current and future main activities are shown in table 3. Many of these activities were activities occurring daily, like ADL-activities. Many activities, however, particularly cultural activities and some leisure time activities, occurred occasionally. Not all activities suggested for the future were prioritised for training. Many of these activities are future activities that the visually impaired person should be involved in, one way or the other, in order to be integrated in the community.

Table 3. Frequencies and percentages of current and future main activities in different spheres of activity.

	Main activities			
	Current		Future	
Spheres of activity	N	Percent	N	Percent
ADL-activities	530	64.4	575	54.5
Work activities	102	12.4	215	20.4
School activities	2	0.2	9	0.9
Leisure time activities	124	15.0	167	15.8
Cultural activities	66	8.0	89	8.4
Sum	824	100.0	1055	100.0

When looking at the number of activities reported in table 3 the increase in number from current to future activities may not seem great. Many of these activities, however, are very time consuming. Although the increase in activities may seem relatively moderate, the time allocated to such activities is substantial.

The results shown in table 3 indicate that work activities were considered most important for future involvement. This is also clearly demonstrated when comparing suggested new activities for the future, and activities prioritised for training for the persons with visual impairment. The results are shown in table 4.

Table 4. Frequencies and percentage of new and prioritised activities in different spheres of activity.

	Main activities			
	New activities		Prioritised activities	
Spheres of activity	N	Percent	N	Percent
ADL-activities	45	19.4	71	28.8
Work activities	113	49.0	117	47.6
School activities	7	3.0	4	1.6
Leisure time activities	43	18.6	37	15.1
Cultural activities	23	10.0	17	6.9
Sum	231	100.0	246	100.0

Almost 50% of the new activities suggested for future involvement shown in table 4 were work activities. A similar picture appears when considering the activities prioritised for training. Some of these activities were activities that the persons participated in before becoming visually impaired, like brick making or going to the market. This may, of course, reflect a need for extending the number of working activities to make income generating activities more effective. Work activities in Uganda are, however, to a great extent a joint venture for the members of the community, and are therefore important both culturally and socially. They are in many respects activities involving many members in the community. Co-operation of community members is frequently required to obtain a satisfying result. Being able to prove oneself in the community through participation in such activities is therefore important for social interaction and integration. A change in attitude for the better towards initiatives for travel, participating in activities, and mood and well-being, were frequently observed.

IMPLICATIONS

These results show that focusing on ecological valid activities is important in rehabilitation of visually impaired persons. In the present study work activities seem particularly relevant. In rural areas, agricultural activities are important, not only for provision of food and as income generating activities, but are also important socially and culturally. They provide extensive social contact and interaction with others. Being able to take part in work activities will both give opportunities for the visually impaired persons to prove themselves in their local society, and satisfy a need for social interaction with other members of the community.

Functional mobility skills are closely associated with the ability to travel independently, and with goal-directed activities, which are intrinsically meaningful for the individual. In functional mobility training the consequence of this is analyses of individual needs, and defining goals related to ecological valid problems. The ability to move independently between different places and activities, is an important aspect of self-sufficiency. It reduces the need for support from other persons, it creates opportunities for new experiences, learning and social interaction. In an important sense, acquisition of functional mobility skills makes it possible for the visually impaired person to cope better with the challenges of daily life, feel competent, and

gain self-respect. Thus, successful mobility training may have wide-ranging consequences for the quality of life of the visually impaired population.

MOBILITY AND REHABILITATION PROGRAMME FIELD WORK EXPERIENCES IN UGANDA

ASHER BAYO
UGANDA NATIONAL INSTITUTE OF SPECIAL EDUCATION
O. BOX 6478, KAMPALA- UGANDA

The Mobility and Rehabilitation (MBR) Programme in Uganda was started as a result of a workshop held in August, 1995 between the Norwegian Consortium and the Uganda Project Committee. The long term aim of the Programme was to train and provide knowledge to persons with visual impairment to become independent, self reliant and to participate and to be involved in every activity within their homes and the community. These activities mainly include activities for daily living, work activities, leisure activities, school activities and cultural activities. The main concept behind achieving this aim is through Mobility and Rehabilitation training, based on individual centred approach in the learner's natural environment. The focus of this presentation therefore mostly looked at the field work experiences which was carried out by the pioneer group of students where activities for the participants were emphasised.

The introduction of this MBR Programme had two overall objectives:

- The first one was to try out and adjust the MBR Programme to the Ugandan Context.

- And to train personnel as Mobility Instructors for implementing the MBR Programme.

The main objectives of the Programme include:

- To develop independence in travel and self sufficiency in skills through Mobility and Rehabilitation training.

- To carry out awareness Programmes on the Mobility and Rehabilitation Programme services for persons with visual impairment.

- To carry out assessment for Mobility and Rehabilitation Programme needs for persons with visual impairment for appropriate intervention.

- To produce and provide appliances for persons with visual impairment.

- To carry out research and documentation on Mobility and Rehabilitation Programme services in Uganda.

The MBR Programme partners in Uganda include:
Uganda National Association of the Blind (UNAB)
Uganda Foundation for the Blind (UFB)
Educational Assessment and Resource Services (EARS)
Ministry of Gender and Community Development (MGCD)
Uganda National Institute of Special Education (UNISE)

These Rehabilitation Service Bodies (RSBs) and Government bodies formed up the MBR Working Committee to plan and implement the activities of the Programme. This MBR Programme will be funded by Norway, represented by Tambartun National Competence Centre up to the year 1999, after which the Uganda Government will take over the responsibilities of funding the Programme through the existing RSBs and partner organisations so that the Programme is sustained.

The nine-month MBR Certificate course, which started at UNISE in October, 1996, was divided into three parts. The first part was theory learning and practicing mobility skills and techniques while under blind-fold. This practice helps the trainees to understand some of the difficulties faced by a person with visual impairment while carrying out activities. But being blindfolded is not the same as being visually impaired because blind-folding is just temporary while being visually impaired is a life long and permanent issue which may or may not be easily reversible. The Mobility practices started within the familiar environment of UNISE and later extended to the busy streets of Kampala, which also acted to sensitise the public on the needs of persons with visual impairment and mobility in particular. They also practiced mobility skills in rural areas, to give them different experiences of environments for training persons with visual impairment both in urban and rural places.

The second part of the course was a ten-week fieldwork practice in the three pilot districts. The third part covered the evaluation of the field experiences and more theory learning. At the end of the course the trainees were awarded with a certificate in Mobility and Rehabilitation as Mobility Instructors.

The Mobility and Rehabilitation fieldwork exercise lasted for ten weeks and it was carried out in three districts of Iganga, Tororo and Mbale. In Iganga district, six sub-counties were covered, eight in Tororo and nine in Mbale - a total of 23 sub-counties were covered during the exercise.

During the initial planning for the fieldwork, 66 persons with visual impairment were identified by the Community Development Assistants (CDAs) and were confirmed by the MBR Working committee members, represented by UNAB and UFB as the beneficiaries of the Programme. In each of the three above mentioned districts, 22 persons with visual impairment were identified, but as the students went out to the districts, only 62 persons with visual impairment were got at home. Two of the original 66 had died; three were not at home while one had left for another district to seek for native medicine. However, new persons with visual impairment were added, so the number of participants increased to 82 as shown in the table below.

Table 1: Number of person with Visual Impairment attended to during the Field Work

	Visually Impaired at Birth		Visually Impaired at a later stage		
District	**Children**	**Adults**	**Children**	**Adults**	**Total**
Iganga	4	1	1	23	29
Tororo	4	0	1	13	18
Mbale	3	1	4	27	35
Total:	**11**	**2**	**6**	**63**	**82**

The category of participants who were trained ranged from children to adults, from those born with visual impairment to those becoming visually impaired later in life, and from those having low vision to those who are totally blind as shown in tables 1 and 2 respectively.

Table 2: Prevalence of visual impairment in the participating group

	Low Vision		Totally Blind		
District	**Children**	**Adults**	**Children**	**Adults**	***Total***
Iganga	4	6	1	18	29
Tororo	2	1	3	12	18
Mbale	2	15	5	13	35
Total:	**8**	**22**	**9**	**43**	**82**

Looking at the various categories of participants who were trained, a number of situations were faced by the students. In the first place, the starting point of the participants varied. Some had the potential to do activities but were not fully involved in them because they were over-protected and were not given opportunity to participate. Many of the participants were passive, while some had secondary disabilities and medical problems related to their visual impairment. Others were neglected and isolated in their communities, while those of school going age were denied the right to education. Some participants were frustrated due the effect of visual impairment. Because of this they were worried or were shy to talk to the student

trainees. Some of them had little motivation to perform activities. Some were very untidy, while others had never been diagnosed and yet their sight could have been corrected.

Amidst all these situations, many of the persons with visual impairment were eager to learn and be trained; some were active and co-operative during the training in various activities.

Being faced with the above mentioned situations there was need to try and solve them and a number of initiatives were taken with the persons with visual impairment in the form of activities. These included activities for daily living, school activities, work activities, leisure activities and cultural activities, all of which were to enable an individual to become more self-reliant, independent and to increase his/her quality of life.

The activities varied according to individual interests, needs and motivation. Children were mostly involved in activities of daily living and school activities, while the adults were involved in work and leisure activities. Among the adults, the priority varied between men and women - men mostly performed work and leisure activities, while the women concentrated on work and daily living activities.

Having completed the fieldwork exercise successfully, assessment was made to the whole exercise and it was noted that the MBR programme helped to improve the mobility of the participants and also resulted in other achievements. The following achievements must be mentioned:

- participants who were passive had become active, increasing the number of activities they could perform, as they were now able to reach several places.

- the participants can now use mobility techniques and skills such as long canes to move from place to place.

- attitudes of the participants towards themselves and that of the society towards them have tremendously changed; for example, a man in Iganga wanted material assistance first before being trained, but after seeing the results of the MBR programme with other participants who were trained, he also requested training.

- many people within the three districts including district leaders have been sensitised through workshops on the needs of persons with visual impairment and have shown interest to support them.

- persons with visual impairment have been socially integrated into their communities and their quality of life has considerably improved.

- at least twelve children with visual impairment have been placed in nearby primary schools under the Universal Primary Education (UPE) programme.

- many participants were diagnosed and at least four of them have recovered their sight with the aid of optical glasses.

Although a number of achievements were registered, there were also some challenges that were experienced during the fieldwork. Therefore the following suggestions were made for the future:

- many people, but especially persons with visual impairment, had poor sanitation: they lacked clean water sources and had poor latrine facilities. The involvement of local councils in sensitisation programmes should be strengthened.

- after Universal Primary Education (UPE) has given educational opportunities to children with visual impairment, one realised that teachers lacked knowledge to teach Braille. It was therefore recommended that District Educational Assessment and Resource Services (EARS) centres should organise short courses for such teachers. Opportunities could also be given to teachers interested in pursuing further education in Special Education at the Uganda National Institute of Special Education (UNISE).

- many persons with visual impairment had not had any medical diagnosis due to (at times) the limited medical services available, lack of information about these services and long distances to medical centres. The District medical outreach services should be strengthened of ambulatory services.

- there was good collaboration among district leaders in providing services for persons with disabilities, especially for persons with visual impairment, but this collaboration was lacking at the grass-root level due to problems in communication and lack of transport to cover the large areas of the districts. There is therefore need to ensure continuity of sensitisation programmes in the districts. All organisations working with and for persons with disabilities and the district leaders should co-ordinate their activities to strengthen working relationships down to the grass-root level, to ensure that all services for persons with disabilities reach them.

- because the MBR programme did not aim to provide material assistance, although some of the participants hoped for this, there was need to raise awareness about the programmes objectives. NUDIPU should link their services to the sub-counties to encourage persons with disabilities in Income-generating activities. In decentralisation, the budget allocation should be done from the district to the sub-county level to cater for the needs of persons with disabilities.

- The last challenge to be mentioned here, that was encountered during the fieldwork was that, most of the participants were very poor and it was difficult for them to afford most necessities at home. Further more, the areas we worked in were by famine and the government had sent some food Relief aid. Persons with disabilities are given as much food as the other members of the community if not even are given priorities as an affirmative action.

To conclude this presentation, I wish to state here that according to the general out look of the fieldwork, the Mobility and Rehabilitation fieldwork was a success because many persons with visual impairment benefited from it and their life conditions have considerably been improved. These experiences have helped us to learn a great deal and to try out many possible solutions to the various situations encountered with persons with visual impairment which has enabled them to improve their conditions of living; to become independent and self-reliant in many ways and finally to participate and be involved in community activities. Mobility and Rehabilitation Programme in Uganda has a brighter future. We look forward for yet the best result.

Thank you.

CHALLENGES OF REHABILITATION OF PERSONS WITH VISUAL IMPAIREMENT (PWVI) IN A DEVELOPING COUNTRY – THE UGANDA EXPERIENCE.

PHOEBE KATENDE, J. M. RWABEIRE BAIRA AND J. T. MIREMBE.
Minstry of Gender and Community Development
P. O. Box 7305,
Kampala – Uganda.

Introduction:

In 1996 and 1997 alone the Ministry of Gender and Community Development identified a total of 1907 Persons With Visual Impairement(PWVI) in their effort to deliver services to Persons With Disabilities in the districts of Tororo, Iganga, Mbale and Mbarara where the Mobility and Rehabilitation programme is being implemented. The figures vary from one district to another as shown in table (1) because it depends on the frequency of meeting PWVI. It should be noted that the districts of Iganga and Tororo have a high incidence of PWVI.

Table (1) PWVIs identified as the Extension Workers implement the CBR Programme in the districts of Mbarara, Iganga, Mbale and Tororo.

Name of district.	No of persons with Visual Impairement Identified.	
Year.	***1996***	***1997***
Tororo.	419	119
Iganga.	468	280
Mbale	187	131
Mbarara.	164	139
Total	**1,238**	**669**

This in essence is not a survey but it shows that the frequecy of meeting Persons With Visual Impairement as they carry out their day to day activites in the community based rehabilitation programme. This clearly shows the magnitude of the problem and the need for intensive mobilisation, needs assessment, planning and a well organised implementation strategy as well as a monitoring and evaluation system which is cost effective.

Challenges.

There are three major challenges in the rehabilitation of Persons With Visual impairment in Uganda in the areas of education, health and community interventions.

Challenges in the area of education.

With the introduction of universal primary education, the number of children with visual impairement has increased in primary schools. Therefore after the mobility instructors have trained the children and are able to move independently, admission in the schools becomes difficult as the teachers are unable to accept the children because they fear handling them, there are no braille materials and machines, not to mention the the poor salaries, which make

teachers unable to be creative and integrate children with disabilities in schools. This automatically demoralises the mobility instructors. In addition the teachers are faced with big numbers of children so that educating children with special needs is a problem.

Challenges in the area of health.

Although there are a number of existing eye care programmes and trained staff in this area funded by Chritofel Blinden Mission, Sight Savers and Norwegian Lions Aid, PWVI and their parents may not afford transport to the eye care centers or may lack information about the services. This is further coupled with low levels of education promoting negative beliefs 'that taking an operation may lead to loss of sight or death'. PWVI may not afford cost sharing (a new policy in Uganda) therefore blindness which could have been averted happens because of lack of prompt treatment. There are a number of Persons With Visual Impairement , who have lost sight due to use of harmful herbs.

Challenges in community interventions.

There is a general lack of post programmes after the mobility training by the instructors because when the excitement of moving independently is over the adults would like to join IGAS and expect to get income within a short time or if they are children they need to be integrated in schools. Some times the Persons With Visual Impairement already have their own competence and may not need training, but the question is, what kind of roles can they play? There are cases where poverty and famine may affect the home based training programme because the immediate need is not mobility training but food.

The approach of individual rehabilitation of each PWVI gives a comprehensive training package but may isolate the PWVI from other community development interventions as "we " as trainers get carried away with home interventions. The process of training takes a lot of time and yet there are so many PWVI in need of mobility rehabilitation. It should be noted that the 5 CDAs trained in the ministry of Gender and Community Development may be able to work with only 40 PWVI a year, therefore a way has to be worked out to increase the coverage given the cases so far identified.

The distances the CDAs have to travel to identify PWVI also pause a problem because most homes with PWVI are scattered in the case of Mbale district the persons with visual impairement are in mountains, this still reduces on the coverage and time spent by each PWVI trained.

Way forward:

- There is need to carry out research on the existing African competence so that it suits the needs of African life given its diverse terraine, political and economic problems.

- Competence building should be promoted where there are existing CBR or community programmes as mobilisation becomes part of the existing structure.

- Mobility should be given a blanket term so that it addresses the needs of all disabilities with mobility problems.

- Moblity and rehabilitation training should be based on well thought out follow up activities in order to reduce on the question, what next?

- Awareness raising on the danger of use herbs of as treatment should be made and small booklets developed on such issues. This should be coupled with information dissemination on the existance of eye care services.

- Moblity training for adults should be linked up with income generating activities, given that the question usually asked is what next after the mobility training.

- NGOs in the field of disability, district councils, disability councils and the department of disability and elderly should endavour to throw heavier weight in supporting PWVI.

- The training should target to train instructors, but also develop short term courses to produce more trainers to work with the families.

ORIENTATION AND MOBILITY FOR SIGHT DEFICIENTS

ROSA MARIA NOVI
“Instituto Londrinense de Instrução
e Trabalho para Cegos”
(Londrina’s Institute of Instruction
and work for the blind)
Londrina – Paraná – Brasil

“There is not a greater to thank God for the sight, than helping someone that doesn’t have it”. Helen Keller.

In this book the reader will find information and explanation that might improve and facilitate the relationship and the integration of the sight deficients with the community where they live.

Basic notions of orientation and mobility – Definitions: Orientation = “It is the ability to recognize the environment and establish your position in relation to the environment. It means: body conscience, objects and space conscience, efficient perceptive moving behavior, and right use of the concepts”. Mobility = “It is the physical ability to move orderly, efficiently, safely through the environment and as independently as possible from one place to another”. Orientation and Mobility = “It is a subject that has the goal of helping the sight deficient people develop or reestablish the capacity for an independent motivation, efficient and safe through the spaces to satisfy their own necessities”. The objective of Orientation and Mobility is to make the blind person or the under normal sighted one walk in indoor and outdoor surroundings with efficiency, gracefulness in a safe and independent way. The reacquired aspects for the process of Orientation and Mobility involve: cognitive area, psychomoving area, and affective area. On the cognitive area the student should acquire the concepts’ formation; attention; problems solving; power of decision; memory and transference; use of the remaining senses. On the psychomoving area they should have balance and coordination; posture and contains attitude. On the affective area, attitude; motivation; values and self confidence. So that the blind person manages to take his/her training ahead it is necessary that he/she has a motivation, an objective to be reached and that he/she is well psychologically.

Stimulation of the remaining senses – 1 - Stimulation of the hearing = as the audition is primordial for the person to orientate themselves, the total silence might make difficult the locomotion of the blind, not in a way that he/she can not move, but in a way of having a little more difficulty to situate himself/herself in the space. Due to this, the audition stimulation must be indicated since the very beginning. It is very important that the parents know the necessity of this training that will later facilitate the locomotions of the deficient. Four areas might be developed: a) Sound localization – “It is the ability of determining the origin of the sound by the auditive information”. b) Sound lining up – “It is the ability of determining the localization of sound followed by a space of continuous time”. c) Obstacles perception - “The obstacles perception recognized like “auditive reflection” it is the perception of the obstacle before the body contact

with him". d) Sound discrimination – "It is the ability of discriminating the necessary sound for the orientation". 2 – Stimulation of the Touching – cinestesical perception – which is of fundamental importance because it is through the feet and the top of the walking stick that they will realize the difference from the floor to the depression, the nature of the existing things on the way where they pass, such as walls, trees, doors, curb, etc. 3 – Stimulation of the smelling and tasting perception – the perception of the smelling and tasting senses area are also important elements for the orientation and locomotion.

Reference points – "It is a characteristic known in the environment that the blind can use to orientate themselves, this allows them to move and walk with confidence in certain directions of the reference point". There are two kinds of reference points. One is the reference that is inevitable like a corner, steps, surface changing on the sidewalk, etc. The others, are those points of reference that are essential when they are walking. A reference point must have an own characteristic that distinguishes him the other objects and that are permanent in the environment. They can be observed by touching, hearing and smelling characteristics, and have the purpose of manteining the distance space, direction relation, walking in straight line orientating themselves in an area. Having concepts of fixed objects and furniture, facility to localize sounds, being familiar with the reference points is extremely important.

Index – "an index is different to a reference point in the way that is not permanent, an index will give information about the environment and what is going on in the environment". Everything that gives information to the blind person can be considered an index. For example, a car that is in front of them is a hearing index; the information that this index gives is that they are arriving on the corner. A breeze itself is an index realized by the touching that can also be felt when one get in a corner, where the breeze gets stronger. There is also the index realized by the smelling. When the blind person can localize a honey house or a tissue shop. All the indexes can be present in a certain moment and in another not, that is why the index is not permanent. Through the index the blind person will be able to realize objects, to interpretate the difference that exists between the car traffic and the walking traffic, to localize sounds, notions of space and distance. The reference points and the indexes are always present in a way or another on the life of a blind person, mainly on the life of that is already independent.

Posture – a good posture is one of the recquired things for the training of orientation and mobility. Therefore, is must be worked previously, being it a specific function of the Phisical Education teacher or the Physioterapist, with the colaboration of the class teacher. So that a posture reeducation work exists, the blind person or of undernormal sight should be motivated, the wish to improve must come from the inside of the deficient. It is not easy to motivate a person without sight to keep a posture because he/she is scared of moving and he/she doesn't know his/her surrounding, it is important that he/she becomes familiarized with the school environment.

Relationships between blind people and normal sight people – the majority of the people think that the blind can not do anything, they should only stay inside the house, that it is an absurd that the blind walk on the streets, work, after all, have a normal life with their limitations. The first attitude of the people that meet a blind person on the street is of pity, of admiration, they

want to help somehow. As they do not know how, they pull them by the arm or walking stick, almost dragging them to the other side of the street, without knowing exactly what is their destiny. How to help a blind person cross the street: a) Ask first if the blind person wants help. At the same time touch his/her arm lightly. b) Offer then your arm. The blind will hold a little above the elbow and will stay from half to whole step behind the helper. They are trained for that. c) Always try to cross them in a straight line so that they will not lose the notion of space and like this, reach quickly the sidewalk on the other side. d) Do not worry with the curb. The blind person will identify it with their walking stick before you tell them.

Relationship with blind people – 01) The blind people are like all the people, they just can not see; therefore, they are also interested in knowing what you like to see, to read, to listen to and to talk about. 02) When the blind person is scorted go straightly to him/her and identify yourself, he/she just does not see you, but he/she is not deaf and will be able to understand you. 03) The blind people can have a watch, make a telephone call, sign the name, etc., Therefore, do not surprised, with training they will be as capable as the ones who see. 04) If you meet a blind person shopping by themselves offer your help. It is very difficult for them to find what they need and to check prices. The person will certainly thank you for your atention. 05) When you offer your help for a blind person to cross the street do not dsorientate them crossing the street in any way other than in the shape of an "L", it is safer for you too. 06) You should never pull or lift up a blind person in the movement of getting in or off the bus or on stairs. It is enough to orientate them putting your hand where the people mmight help themselves or on the stairs'handrail. 07) To help a blind person to sit down it is enough that you put hand back of the chair because it will show their position.08) Pay atention to indicate "right", "left", on the moment of helping a blind person, take their position and not yours as reference. 09) Try to keep the doors well opened or closed where there are blind people. The half way opened door is a danger obstacle for them. And also try not to leave objects on the floor where the blind is used to passing by.10) When you take a blind person for a car ride, on the moment of closing the door never forget to check if it is going to catch their fingers: they are really precious. 11) Never leave a blind person talking to themselves; if you have to leave, tell them. And tell them too when you are going to return. 12) Try not to forget to introduce your blind visitor to the other present persons, so that it will facilitate the integration of the person with the rest of the group. 13) If there is anything wrong on the way the blind person is dressed do not be ashamed to tell them. Be sure that they will thank you. 14) When a blind walks alone, be alert in all the remaining senses; try not be correcting them all the time otherwise they will get nervous and desorientate themselves. 15) If you know a family that has a baby with sight problem, tell them to take him/her to a specialized institution, the earlier the baby is stimulated, the quicker he/she will manage to overcome his/her difficulties.

ORIENTATION IN RURAL AREAS

Moira Higgerty
South African Guide Dog Association for the Blind
P.O. Box 67585
Bryanston
2021
South Africa

INTRODUCTION

Forty-four point six percent of the population of approximately 38 million live in the rural areas of the country. Owing to the higher incidence of blindness in rural areas, there are large concentrations of visually impaired people living in these areas of South Africa.

Rural villages may vary considerably in their size, layout and proximity to other villages and/or towns. However, all have in common a generally unstructured layout and are serviced by sand or gravel roads, wheel tracks and footpaths.

BASIC ORIENTATION

The majority of homesteads comprise more than one unit. In other words there is a cooking hut, several sleeping huts and possibly a storage hut as well as an outside toilet. The visually impaired person's basic needs of independent travel within the home, usually require the location of the various huts, toilet, water point, washing line or fence and where present, entrance to the field(s) where crops or vegetables are grown.

Using the pre-cane skills of squaring off, straight line walking, accurate turns, protective techniques and direction indicators, such as left/right, in front/behind, clock face the sun and compass directions, it is generally a reasonably straight forward task to orientate the visually impaired person in the location of the various huts. However, difficulties may be encountered in locating more distant points such as the toilet. Assistance may be given by demarcating the pathway more clearly, by placing stones on one or both sides of the pathway, or constructing a wire or rope handrail from the hut to the toilet which can then be followed more easily by the visually impaired person.

THE RURAL ENVIRONMENT

National tar roads which carry very fast moving traffic frequently by-pass a village. Where present they form a link between one village and the next. The bus or taxi rank would normally be located on these roads.

Generally, the roads linking villages and/or passing through a village are dirt. They may be wide, narrow, straight or with frequent turns. Usually they carry infrequent traffic. Additionally

the surface of these roads may be hard gravel, soft sand, loose pebbles or very rocky. Roads that are narrow may become wide and vice versa. Also present in the village environment are footpaths which may link streets and more distant settlements, cross open areas, lead to the fields etc. Footpaths seldom if ever run straight, if a footpath becomes impassable due to erosion, a new footpath is made next to the original one and so several footpaths may run alongside one another. Footpaths frequently intersect with other footpaths. Where several footpaths intersect, the area around the intersection may be more open.

LANDMARKS

Niemandt (page 6) suggests that there are five basic types of landmarks.

Permanent landmark, that is an object which can be experienced through any of the senses, that is permanently present in the environment. For example, the sound of vehicles along a distant highway, the touch of a gate or fence, the smell of a toilet and the slope of the road.

Temporary landmarks (clues) that are an object, which can be experienced through any of the senses, but is not permanently present in the environment. It may vary depending on the season, time of day, weather conditions etc. For example, the sound of a river in summer or dry leaves in autumn. The touch of long grass or dry grass. The smell of certain plants and the changes in road surface (texture and gradient) which may occur due to rains.

Artificial landmarks - are landmarks or clues which may be specifically placed in the environment to identify a footpath. Experience, however has shown that what ever you the Instructor may put in position for the visually impaired person to use, is just as easily removed by other villagers.

Landmarks you cannot miss - that is any landmark which is virtually impossible to miss while travelling along a road or footpath. For example, a bridge over a river, a large tree root that crosses a pathway. Routes should include these landmarks at well interspersed intervals.

Landmarks you only find if you look for them - in other words this type of landmark you will only find if you know about it and look for it. For example, confirmation that the traveller is on a correct path may require scanning to locate a fence. These types of landmarks are particularly important to make use of, where possible confusion may result at intersections when the wrong road or footpath may be taken.

ORIENTATION

Orientation has been defined as “the process of using the senses to establish one’s position and relationship to all other significant objects in one’s environment” (Hill and Ponder 1976.3)

Hill and Ponder (1976) also suggest the need for certain prerequisites in order for orientation to take place. While these form good basic requirements for general orientation, certain aspects need to be emphasised when referring to orientation in the rural environment.

“an awareness and knowledge of body parts, their movements and function”

”a knowledge of the environment”. The first step is to establish boundaries to the village or area to be travelled. This helps in providing an overall picture and at a later stage can help the blind traveller to identify where he is. Also important is to provide information concerning the basic structure and layout of the village.

“an ability to relate environment to environment in a functional manner” Information based on descriptions alone are seldom functional, in that, what one person may consider to be a steep slope may be seen by another as a slight slope. It is, therefore essential to travel this area with the visually impaired person first, using the sighted guide technique, whereby important landmarks and clues can be identified and experienced.

Commonly streets and houses are unnamed and numbered. Streets are usually identified by the name of someone living in that particular street or perhaps by some unusual feature such as the green hut on the corner. In this respect, it is important to work together with the visually impaired person in identifying names for streets or footpaths. Where none exist use relevant information such as a shop, tap, river to identify the road or footpath, for example shop road, tap road, river path etc.

The use of the sun as a direction indicator and identifier of compass points is very useful.

“proficiency in performing certain independent movement skill”. It is important to teach the mobility skills required for travel through the visually impaired person’s environment before commencing orientation to a particular route.

“an ability to perceive and integrate sensory information from the environment”. Hearing is perhaps the most used sense, not only in terms of sounds from the environment but also in interpreting the sounds made by the blind traveller through the feet and cane. As looking for a landmark may rely on distance travelled, the estimation of distance is also important. Identifying changes in gradient, positioning and relationship of self to landmarks and landmarks to one another need to be highlighted.

ORIENTATION GUIDELINES

Instructor needs to gain a sound knowledge of the area and routes to be travelled. Select suitable landmarks (“It is more often the contrast rather than the detail (Niemandt: 61) which is of greater benefit to the blind traveller).

Development of good safe techniques and use of the senses can be achieved during early orientation to the home and neighbourhood.

Essential is the visually impaired person’s own knowledge of the environment. This can be developed through the establishment of boundaries, a good understanding of the village layout and structure, appropriate naming of streets and footpaths.

Break routes into manageable stages. First familiarise the visually impaired person to the route, landmarks and clues by means of a sighted guide.

A longer training time may be necessary to provide the visually impaired person with plenty of practice in travelling along each section of a route.

The application of appropriate techniques enables the visually impaired traveller to be successful and concentrate on relevant information such as interpretation of the senses for orientation purposes.

CONCLUSION

While rural areas often seen to present the 0 & M Instructor with insurmountable barriers to orientation, this is often due to our own lack of knowledge of the area. Not without difficulties, it is possible to travel successfully through most rural environments.

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ORIENTATION AND MOBILITY - THE INTERNATIONAL FACTOR

DENNIS CORY

During the last fifty years, formal Orientation and Mobility (O&M) Instruction for blind and low vision persons based on the program initiated in Valley Forge Army Hospital and later refined at the Veterans Administration Hines Rehabilitation Center has spread from the United States of America to many other countries. The various published accounts of this expansion seem at first glance to deal with a simple situation. Courses for blind and/or low vision persons are conducted, plans for training instructors are set up and to the sound of soft violin music in the background visually impaired mobility students walk off into the sunset.

A closer look at the spreading of O&M skills and related theoretical considerations reveals, however, that all of the professionals who pioneered O&M services in their own country or even in other countries needed to carefully evaluate and modify the USA model for such direct services to consumers and for training O&M Instructors. Often programs were created with quite different emphasis, length and content when compared to the Hines program. The contrast with the university programs with developed in the early sixties in the USA was often even sharper. Certainly all attempts in this area had at least one thing in common - the desire to promote independent and safe travel for blind and low vision persons.

Long Cane Training

The long cane was, of course, the very visible symbol of the O&M system and this led some of the pioneers to a reduction of “Orientation and Mobility” to “Long Cane Training”. The “Long Cane Teachers” were usually very well intentioned professionals in the blindness or low vision rehabilitation field who had briefly observed an O&M program in the USA or later in Great Britain, Denmark, the Netherlands or France. Such observations often included some blindfold experience but could not be categorized as an O&M Instructor Course. Later on organizations such as the American Foundation for the Overseas Blind (now Helen Keller International) and the Christoffel Mission for the Blind, which were aware of the need to make basic knowledge about O&M more widely available, used short courses of five or six weeks to do this. These workshops were generally considered to be a first step on the way to programs of greater length and larger content based on the environment and social structure of the country in question.

City Blocks versus Rivers and Castles

The emphasis in the "Long Cane Programs" set up after such short observations was mainly on cane skills and rote learning of specific routes. Frequently the argument in support of rote learning of routes was based on the clear environmental differences between the USA and many other countries in the world - the system of rectangular city blocks numbered and named in a grid pattern which could be transferred easily from one city to another. In Europe where city patterns are often based on the course of a river and the rings around the castle on the hill, counting blocks and relying on numbering systems just didn't work. The search for a straight "Main Street" and a "Division Street" equally as straight usually met with failure. Irregular street patterns soon led to an intensive map making phase and the search for a good compass for blind travelers.

Short Courses

The development of training programs for teachers in this environment was not given very high priority. Usually the new "Long Cane Teachers" could start working with blind persons after completing a three to five week course themselves. It became readily evident that the length and content of the teachers' training directly influenced the instruction of consumers, particularly in regard to independent orientation, audition and street crossings. The tendency was to limit the freedom and independence of blind travelers. It was, however, a limitation not immediately noticed because the increase in safe mobility with the long cane was enormous compared to the prior mobility with a short cane or no cane at all. It was usually in the international comparison that these limitations were noticed.

Coexistence

In spite of limitations the programs were almost always a success for the consumer measured on what had been previously available. The success in the early stages of the expansion of O&M in several countries can be explained by the experience and courage of the blind persons trained and the motivation of the teachers to gain additional competence. The first blind persons trained were usually younger, employed persons with a high motivation to improve mobility skills which had been acquired in an autodiclactic fashion. They had travel experience with the short cane in very difficult environments as well as good orientation. Often they really needed "only" long cane skills. Therefore most instruction was brief and often the teacher learned more than the consumer.

As members of the blind and low vision population with multiple challenges and little if any previous mobility experience gained access to such instruction, the "Long Cane Teachers" came to recognize the importance of such words as "orientation", "concept development" and "individualized programming". Cane skills alone no longer provided enough foundation for independent travel. Transferable knowledge, behavioral patterns and communication skills could not be so simply and quickly taught. A standard instructional plan just didn't work.

The trend thus had to move from short introductory courses for O&M instructors to longer courses based on those at the National Mobility Centre in Birmingham, Great Britain; the Institute for Blind and Low Vision Persons in Hellerup, Denmark; and to some extent on the university programs in the USA. This created a situation in many countries in which Long Cane Teachers and O&M Instructors coexisted for several years. Grandfather and Grandmother clauses helped to resolve most of the situations in Western Europe in the early 1980's. The situation has reoccurred to a certain extent following the opening of borders to Eastern Europe, where a variety of factors limited the development of O&M. Today, however, the greatly improved communication system is helping to shorten the time needed to achieve standards appropriate for each country. A good example of this communication is the Dona Sauerburger Hot Line, sometimes known as the O&M Listserve in Internet.

Other Countries, Other Customs (OCOC)

The content and the design for the development of O&M programs for blind and low vision persons and for the instructor training programs are strongly influenced in each country be the existing systems for education, rehabilitation and social welfare as well as access to simple and complex resources. When these quite different systems were combined with the different definitions of O&M as it spread the results were always interesting.

In the Federal Republic of Germany (widely known as West Germany) for example, the first instructors' courses were offered by a private school for blind children because the German university system was not geared to such a practical program. This caused O&M in West Germany to spread first to the special schools for blind children in the mid 1970's and to first be offered in the Center for the War Blind in 1977, almost 30 years to the day after the opening of the VA Hines Rehabilitation Center.

The German health insurance system which has traditionally been responsible for distributing the classic short white cane and dog guides was the logical place to start the search for a funding agency. The regulations require that any device distributed through the health insurance system must be adequately explained to the consumer and if need be, instruction in its use given. This regulation was the basis for a court decision leading to funding of the long cane and the necessary instruction and which made it possible for blind persons to obtain a long cane and the training to use it.

The simple presence of a social welfare system or comprehensive health insurance in a given country cannot, however, be seen as an automatic and uncomplicated way to introduce and fund new services. Such structures are often quite old and very traditional in their thinking. When something new arrives on the scene, there are three basic arguments given: 1) We have never done it that way. 2) We have always done that another way. 3) If we do it your way, everyone could come and request the same treatment.

The German Office of Labor, for example, could find now official job description for an O&M Instructor, thus giving employers a free hand to determine salary, job description and work schedule. The situation existed in which the services were funded but few persons were inter-

ested in becoming an O&M instructor under the prevailing conditions. At the same time the Office of Labor recognized the O&M Instructors Courses as a so called “additional qualification course”. This meant that scholarships for participants were available.

In residential schools principals argued that O&M belonged in the dormitory program and not in the school’s curriculum. Based on this reasoning they then sent dormitory counselors instead of school teachers to be trained as O&M Instructors. When Rick Welsh met with the principals of several such schools in Marburg, Germany, prior to IMC 1 in Frankfurt, he astounded them with the comment that O&M instructors in the USA frequently needed both the certification as a teacher and as an O&M instructor to work with children in the public school system and that this double qualification could mean better pay than the that of the regular teacher.

International Exchange and IMC

Those of us associated with the initiation of O&M services in any given country know how important the contact to experienced colleagues can be. In Germany we were certain that the developments merited a concerted effort to intensify international communication on the topic. The Deutsche Blindenstudienanstalt (German Institute for Blind Studies) in Marburg arranged for Rick Welsh to spend some time at the Institute and meet with the principals of several schools as I mentioned above. The Institute also coordinated the International Mobility Conference (IMC) in Frankfurt from May 25 through May 27, 1979. The basic idea was to get the most out of Rick’s visit as possible. The initial plan was to have a meeting for Rick with only the West German O&M instructors but soon the idea was expanded to use this conference to gain an overview of what was going on in several European countries in regard to O&M.

The proceedings of that first IMC list quite succinctly the aims of IMC:

1. Short description of mobility training today in different parts of the world

2. Interchange of ideas and experience, especially among European mobility trainers

3. Discussion of problem areas in which work must be intensified in the future.

4. Proposals for the organization of closer cooperation in Europe and with other parts of the world.

I think it is significant that the terminology at that time still reflected the trends in the field in Europe: not Orientation and Mobility Instruction but rather mobility training, not O&M Instructors but rather mobility trainers. However, by including German consumer and professional groups as well as the Minister of Social Welfare in Hessia in the planning and sponsorship of IMC we could give O&M in Germany an important impulse. This has become an important by-product of IMC - giving the host country an opportunity to focus public and professional attention on O&M services. Another factor which is very important is the opportunity

for practitioners of the host country to meet in the international context. Rumor has it that IMC 7 in Melbourne drew almost all the O&M Instructors of New Zealand and was the framework for one of the best attended business meetings of the O&M Instructors Organization in that region of the world.

After the first three European IMCs (Frankfurt, Paris, Vienna), the conference became even more international with IMC 4 in Jerusalem. That conference saw the creation of two important new elements: the use of the workshop format to enhance the direct lecture system and the first satellite conference for personnel preparation centers. This addition to IMC made it possible to have time for a very specific topic with a limited attendance.

The return to Europe with IMC 5 in Eindhoven in the Netherlands and IMC 6 in Madrid demonstrated the continuing growth in attendance and a particularly intensive cooperation with consumer groups as well as the further refinement of the conference format. It had become quite necessary to move [MC to various parts of the world to give more practitioners the opportunity to attend. This goal led to IMC 7 in Melbourne where the idea of post conference seminars in addition to the satellite conference was given a good start. This led to the pre-conference sessions on research and basic mobility at IMC 8 in Trondheim, Norway.

Initially there was a certain dependence on experts from the USA to keynote IMC, organize the satellite conferences and offer important contributions to the program. I feel very fortunate to have convinced such dedicated professionals as Rick Welch, Bruce Blasch, Butch Hill and Bill Wiener to take on major responsibility in early IMCs and Satellite Conferences. As time has gone by, the national program committees for IMC could choose from an ever increasing group of international experts offering papers, posters and topics for IMC. It cannot be denied that a certain uneasiness about too much USA influence at IMC exists. For many the above mentioned transition from clearly numbered rectangular blocks in the New World cities to the winding alleys of many old towns in the Old World presented a challenge that could not be met by USA expertise alone. This is equally true in rural districts in Africa and Asia. The stronger the O&M movement outside the USA has become, the less apprehensive one must be about USA participation.

This is quite evident in the decision of the International Organizing Committee to hold IMC 9 in Atlanta. With a program in which a large majority of the presentations and posters will be given by experts from outside the USA, the goal of a balanced exchange of information has been achieved by the national organizing committee here. The wide variety of methods, programs, materials and ideas presented in this IMC reflect educational systems, social welfare schemes, and the politics of the blindness system and the potential of the self-help organizations.

When I left the USA in 1976 to return to Germany I didn't have IMC in mind. I was looking forward to interesting work and good beer. The development of IMC was frosting on the cake (or should I say foam on the beer?) It has been the opportunity to give many highly motivated, talented and expert professionals a forum. It has allowed me to work with Claude Chambet, Jutta Wiesenhofer, Nurit Neustadt, Marten van Doorn, Solidad Luego, Gayle Clarke, Bengt

Elmerskog, Eileen Siffermann and her helper. Bruce, to you a special word of thanks for helping to bring me home. I wish Butch could have been here to accept my thanks as well.

I personally feel that any purpose I may have had in IMC has now been fulfilled with the IMC 9 in Atlanta. The circle is complete and the time has come for me to let a sort of natural rotation continue. At the close of this IMC I shall no longer be involved with the International Organizing Committee. Actually I had intended to resign following IMC 8 in Norway but the tremendous spirit created by the Norwegian national committee and the positive emphasis they placed on expanding the base of participation convinced me to stay on until now.

Each IMC has brought a new and qualified O&M instructor onto the committee. The small efficient group should be maintained. I would suggest keeping the representatives from France, Israel, the Netherlands, Spain, Australia, Norway and the USA as a standing committee and having subsequent members on a temporary basis. Since IMC has never claimed to be a real organization we have no delegates, no charter and no possibility to vote on this. That does, however, mean that all of you can express your opinion on the future of IMC to anyone on the International Committee.

With South Africa, Sweden, Italy and perhaps even more countries expressing interest in conducting IMC and with, as you will hear later, Great Britain well on in the planning of IMC 10 it is evident that the further development of IMC in not dependent on one person.

So let me close by thanking each person and groups of persons who have planned and conducted IMC in the past and in particular to Eileen and Bruce for maintaining the momentum of Trondheim here in Atlanta. I am grateful for the opportunity to observe the continuing development of IMC on the international level and look forward to this IMC.

Dennis Cory, IRIS e.V., Bachstrafle 30, D-22083 Hamburg, Germany

ORIENTATION AND MOBILITY PERFORMANCE ASSESSMENT OF STUDENTS WITH VISUAL IMPAIRMENTS IN FLORIDA

CAROL B. ALLMAN, PH.D.
Florida Department of Education
325 W. Gaines St.
Suite 614
Tallahassee, Fl. 32399-0400

The accountability movement provides justification for assessing the progress of students in order to recommend and define programming options. Little data exists on the performance of students with disabilities on specific orientation and mobility (O&M) skills. In Florida, accountability efforts recommend the use of state-wide assessment, district assessment, and teacher-managed classroom-based assessment to assess the progress of students. The collection of assessment data in the area of orientation and mobility for students with visual impairments is an initiative of the Florida Department of Education for the 1997-98 school year and has been initiated to give feedback to O&M instructors on a state-wide basis, assess the O&M program and plan needed inservice training for O&M instructors .

During the school year students with visual impairments in Grades K-12 are being assessed on identified performance criteria in the area of orientation and mobility. The scales used for this assessment were developed in 1989 through Disability Research Systems (DRS), Lansing, Michigan using field expert consensus for identifying desired performances. Florida received permission from DRS to replicate the assessment. Performances are assessed at five levels: K-1st grades, 2nd-4th grades, 5th-7th grades, 8th-10th grades, and 11th-12th grades. Skills appropriate for each of the levels are addressed in the areas of:

Technical Ability to Move About in One's Living, Neighborhood, Community, and Work Environments

Technical Ability to Use All Major Forms of Public Transportation

Technical Ability to Travel to Specified Destinations in an Unfamiliar Community of at Least Moderate Size (approximately 50,000) and Return to Point of Beginning

Ability to Locate and Read Survival Symbols in Order to Access Public Places

Assessment scales were sent to Orientation and Mobility Instructors and Program Contacts for Visually Impaired in each of Florida's 67 school districts in September, 1997. O&M instructors were asked to complete an assessment scale for each student that was receiving O&M services and were instructed to return completed scales to the author by December 31, 1997. In early December, 1997 the author mailed reminders to all participants and extended the due date to March 1, 1998. Seventeen school districts had submitted data as of February 1, 1998. The results are to be tabulated in May, 1998 and will be presented at the 9th Annual International Mobility Conference . If you wish to receive the results, please contact the author at the address above or call (850) 488-1106 or email allmanc@mail.doe.state.fl.us.

DEVELOPMENTS AND DILEMMAS: KIWI KIDS AND ORIENTATION & MOBILITY

KAY DALY AND JANE MOORE

Orientation & Mobility Consultants
Moving Forward
84A Woodlands Park rd, Titirangi
Auckland, New Zealand

New Zealand, or Aotearoa-the land of the long white cloud, is situated in the South Pacific Ocean. It is a country of two major islands containing a multicultural society of around 3.5 million people. Although the capital of New Zealand is Wellington, its major city is Auckland with a population of over 1.3 million, a third of the overall population of New Zealand. New Zealand's most commonly known symbol is that of a native, flightless bird, the kiwi. In fact, New Zealanders are often called 'kiwis', hence the reference in this paper to 'kiwi kids'. New Zealand is a very rural country and is often the butt of jokes regarding its other well known, and huge, population: its sheep!

Within the current population of New Zealand there are estimated to be around 11,000 people who have significant vision disability. The percentage of these people considered to be children is difficult to determine. Estimates of the number of children who have severe vision disability seem to be between 1,100 and 1,400 depending on the criteria used. Many of these children receive educational itinerant services from Visual, or Sensory, Resource Centres scattered throughout the country and located at schools. With the exception of the Auckland Visual Resource Centre these services do not include orientation and mobility. Orientation and mobility services in New Zealand are provided by the primary service agency for vision disability, the Royal New Zealand Foundation for the Blind (RNZFB). The RNZFB is a voluntary agency primarily funded by the health dollar to provide, almost exclusively, rehabilitation rather than education or habilitative services. The health dollar funds services for people over the age of 18 years only. Hence, the current dilemma of lack of orientation and mobility services for children.

Recently, advocacy for early intervention in the area of orientation and mobility has peaked media involvement. This has drawn the issue to a head and encouraged government level notice. Orientation and mobility specialists and other stakeholders have begun exploring options and limitations regarding the issue of orientation and mobility for kiwi kids. However, this has been a long, drawn out process of consultation with little action. In the interim, kiwi kids in need of early intervention in the area of orientation and mobility, are growing up.

Along side the dilemmas regarding funding are issues concerning: whether orientation and mobility for children is a health or educational issue; professional competency issues, such as whether you have to be a classroom teacher to work with children in the field of orientation and mobility; curriculum issues, such as whether concept development and early purposeful movement come into the orientation and mobility for children curriculum or not; service deliv-

ery options, such as whether orientation and mobility specialists for children should be situated in education or rehabilitation settings- and training issues, such as do orientation and mobility specialists for children need to be AER registrable (ie postgraduate trained).

In the face of these multiple dilemmas there have been some significant developments. In 1993 a working party of professional orientation and mobility specialists made submission to the Ministry of Education in an attempt to have orientation and mobility for children included as part of their regular education curriculum. This submission was declined by the Ministry of Education due to the specialist nature of orientation and mobility. Orientation and mobility for kiwi kids was again shrouded in cloud.

In 1995, in recognition of the huge need, Homai Vision Education Centre (HVEC), the sole specialist educational facility for child who have vision disabilities, began developing courses to instill a variety of professionals in aspects of orientation and mobility for children, The HVEC Assessment/Training department took on the massive challenge of developing and running qualification linked courses in the area of orientation and mobility. The culmination of years of effort has been the addition of a specialist paper in orientation for children to the New Zealand Qualification Framework in 1997 as well as the near completion of a curriculum and training package in the area of Developmental Orientation and Mobility. However, although the orientation and mobility paper, curriculum and training package now exist in New Zealand, politics, funding, and administration dilemmas, have again, resulted in halting any commencement of training and positioning individuals in the area of orientation and mobility for children. Kiwi kids are still growing up with professionals who ‘do the best they can because there is no-one else to provide’ early intervention orientation and mobility services.

This presentation overviews the developments and dilemmas that have been, and still are, associated with orientation and mobility for children in New Zealand. It also introduces the professional training and curriculum initiatives currently being proposed to meet this most important area of need.

AN INQUIRY INTO ‘LOW-DETECTION’ WHILE USING THE LONG CANE

ROLAND VAN GRINSVEN
Wim Perik
Theofaan Institute
St. Elisabethstraat 4
The Netherlands
ROELOF SCHELLINGERHOUT
University Of Nijmegen
PO Box 9104
6500 HE Nijmegen
The Netherlands

General Background

The long cane is the most widely used mobility aid for persons with a visual impairment. However, systematic research into the use of the long cane, and into the coverage provided by the long cane, is only now beginning to emerge. Most of this work is done by Blasch and colleagues (Blasch, La Grow, & De L’Aune, 1996; La Grow, Blasch, & De l’Aune, 1997), who recently developed measures with which it is possible to express the effectivity of the use of the long cane.

The major part of the research in the past has focussed on the techniques used for cane walking. The techniques used for cane walking have shown some development over the years. In the 1870’s Levy first described in a systematic way the use of the long cane as a mobility aid. After WO II Hoover (1946) changed and formalised this system in a method which is known presently as the ‘touch technique’. In this technique, the cane is sweeped systematically from side to side, and it is supposed to touch the ground where the next footstep is going to land. In the 1980’s Fisk (1986) developed the constant-contact technique, in which the tip of the cane is in constant contact with the ground.

In spite of the interest in walking techniques the design of the long cane has basically remained unchanged for many years (Blasch & Stukey, 1995). Canes may differ in the material they are made off, in their length, and in their foldability. However, the basic design of the long cane is a straight stick.

The traditonal straight long cane does not always provide sufficient coverage. Low, especially narrow, obstacles are not always detected. The same is true for differences in height in the surface of support, such as downward steps. In terms of the measures developed by Blasch and his colleagues, the traditional long cane does not always provide sufficient foot-placement preview and surface preview.

The coverage provided by a cane, both in terms of foot-placement preview and surface preview, may be improved by reducing the angle between the tip of the cane and the ground. The smaller the angle between the tip of the cane and the ground, the higher the probability that one will detect an obstacle or a downward step. One way in which the angle between the tip of the cane and the ground may be reduced, is to enlarge the length of the cane. This manipulation however, has many practical drawbacks. A better way to reduce the angle between tip and ground is to give the cane a kink at the point where the tip touches the ground. This idea concerning the design of the long cane, developed by fellow-workers of the Theofaan Institute, is the basis of the present research.

Research

Experimental setup

In the main research we will compare the coverage provided by the traditional straight long cane and an experimental cane, which has a kink where the tip touches the ground. Our main hypothesis is that the coverage provided by the experimental cane will be better than the coverage provided by the traditional cane, in terms of obstacle-preview and surface-preview.
The research will involve: (1) a direct comparison between the traditional cane and the experimental cane under controlled conditions and (2) a naturalistic investigation, in which participants are allowed to try out the experimental cane during a three week period.
The direct comparison between the traditional cane and the experimental cane will involve:

- a kinematic analysis of the cane walking itself
- detection of obstacles, which will be manipulated in their height, width, and depth.
- detection of downward steps, which will be manipulated in their height and slope.

Pilot experiment

In a pilot experiment, the procedures and equipment for the direct comparison between the traditional long cane and the experimental cane were tested. Participants were two naive experienced cane walkers, with no previous experience with the experimental cane. Results of this pilot experiment were largely in accordance with our main hypothesis.

For the kinematic analysis, participants were filmed while they were walking a previously determined straight path. The kinematic analysis revealed that, at any moment during a right-left or left-right swing with a cane, the angle between the tip of the cane and the ground was smaller for the experimental cane than for the traditional long cane. This indicates that, in principle, one should detect smaller obstacles with the experimental cane than with the traditional long cane. This finding was corroborated by the analysis of the obstacle detection with the two canes. Obstacles with a height of 10 cm were mostly missed with the traditional long cane, but were detected with the experimental cane.

Main Research

The main research will be carried out in the months march and april of 1998. The number of participants for the direct comparison between the traditional long cane and the experimental cane will be approximately 24. The number of participants for the naturalistic investigation will be approximately 38.

Results of the main research, which will be availlable at that time, will be presented at the conference.

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Development and Evaluation of a Novel Type of Audible Traffic Signal for the Blind Pedestrians

MASAKI TAUCHI, HAJIME SAWAI, JINRO TAKATO, TAKASHI YOSHIURA* AND KOHEI TAKEUCHI**

Department of welfare and Social Secvice, Okayama Prefectural University, 111 Kuboki, Soja-Shi, Okayama 719-1112 Japan, * Koito Industries, Ltd100 Maeda-cho Totuka-ku, Yokohama 244-0804 Japan, **Universal Traffic Management Society of Japan Airman's Building7th Floor No6, 2 Ichigaya-Tamachi Shinjuku-ku, Tokyo 162-0843 Japan

INTRODUCTION AND PURPOSE

The audible traffic signal (ATS) system presently operated in Japan uses two speakers located on each side of the crosswalk that emit sounds (melodies or a birdcalls) simultaneously whenever the traffic light signal for pedestrians turns green. The primary purpose of an ATS is to provide information about the status of the pedestrian light signal to blind or visually impaired pedestrians who walk alone. Although the ATS seems to help visually disabled persons to travel independently by providing a auditory signal corresponding to the visible "go" and "stop" signs of a traffic signal, the present forms of ATS still may not ensure safe road crossing

One of the main issues of the present form of ATS is whether the sounds emitted from speakers provide a useful navigational aid from when a person steps onto a crosswalk until they finish crossing. During this entire time, it is extremely important for blind pedestrians crossing the roadway to be oriented in the direction of the end of the crossing (Fig. 1).

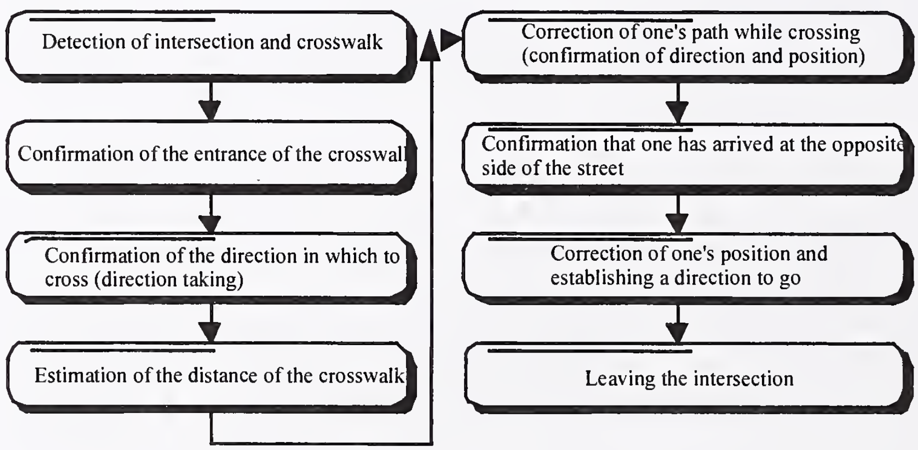

Figure 1. Schematic diagram showing a series of tasks required to the visually disabled to cross intersection

The ATS presently used in Japan does not provide sufficient clues for these purposes, as has been suggested in our past experiments 1). We therefore developed and evaluated a new ATS

system that alternately produces sounds from both ends of the crosswalk, rather than simultaneously 2). The principle is that alternate sounds from two speakers would provide navigation clues for a blind pedestrian by localizing each sound signal independently. In this report we describe evaluation of ATS of present form and newly developed ATS for sound localization of signals from the front speaker.

EXPERIMENTAL METHODS

To evaluate whether a blind subject can differentiate sound signals from two speakers located on both ends of pedestrian crosswalk and can identify the signal from the speaker in front of them (the front speaker) correctly; two sets of experiment were carried out. In these experiments, the navigational effects of the presently used ATS system (emits sound simultaneously, simultaneous sound thereafter) and newly developed ATS (emits sound alternately, alternate sound thereafter) were compared.

One experiment (Experiment 1) assessed whether subjects can detect sound from the front speaker in simultaneous and alternate sound conditions and how accurately they can localize the sound signal in the horizontal plane. In the second experiment (Experiment 2), the subjects judged the rough direction of the front sound signal within a limited time when sitting at various angles to the front speaker.

Subjects: Ten blindfolded (but sighted) subjects participated in the present experiments, consisting of 3 males and 7 females.
ATS: The newly developed ATS was used. This system can emit sounds (birdcalls) from two speakers either simultaneously or alternately. The repetition rate, duration, and volume of sound from each speaker could be controlled separately. The signal was emitted at the frequency of 0.7 Hz and the volume was 65 dB at 1 m from the speaker. For the alternate sound, the repetition rate for one speaker was 1/2.8 sec and 1/1.4 sec (0.7 Hz) as a system.
Experimental room: The experiments were carried out in a sound-proof, semi-anechoic room to avoid unexpected noise from the outside and sound reflection that might interfere with distinguishing localization of sound by the subjects. Two speakers were set on the ceiling about 7 m apart and placed facing each other to simulate crosswalk. Between the two speakers, four free-rotating chairs were set at experimental positions. Each position was named entrance, first middle, second middle, and exit and the distances from the rear speaker were 1.0, 1.56, 4.12, and 5.68 respectively.
Experiment 1: Subjects sat on one of the four chairs and faced the front speaker after complete disorientation. They were asked to distinguish the sound of the front speaker from that of the rear speaker first, and then move in the direction that they thought was toward the front speaker. The sound was given for 11 sec for both the simultaneous and alternate sound conditions.
Experiment 2: The same experimental set up was used as in Experiment 1. In this experiment, subjects were positioned at certain angles (from 0 to 15 degrees) to the front speaker and no movement of the body or chair was allowed while listening to the sound. Subjects were asked to identify the direction of sound from the front speaker within a limited time: one cycle for the alternate and two cycles for the simultaneous sound mode. The subjects expressed the identified direction of the sound as ' middle,' ' right,' and ' left.' to their median saggital plane.

RESULTS

Identification of sound target from multiple sound sources (Experiment 1) When subjects sat on the chair placed between two speakers and were asked if they were able to identify the sound in front after listening to a series of test sounds, remarkable differences were found between the simultaneous and alternate sound conditions. For simultaneous sound, most subjects were not able to distinguish the sound of the front speaker from that of the rear speaker in 'entrance' and 'first middle' positions. On the other hand, for alternate sound, they could differentiate sound from the two speakers at all sitting positions. These results suggest that the present ATS does not indicate the direction in which to walk at the entrance and the first half of the crosswalk (Fig. 2).

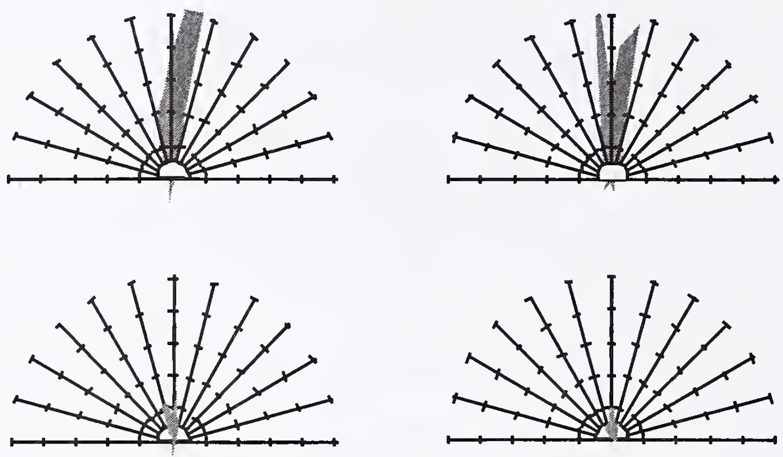

Figure 2. Scattering of angles of subjects taken toward the sound emit from front speaker
Top row shows angles of subjects in simultaneous sound condition; bottom row shows angles of subjects in alternate sound condition. The numbers on the center bar of each graph indicate frequency. Zero degree corresponds to the direction of front speaker. Positon A is 1.0m and position B is 2.56m from rear speaker respectively.

In the second half of the crosswalk, the signal from the front speaker could be frequently identified correctly for both types of sound condition.
Accuracy of identifying direction of sound sources (Experiment 1)

In cases where subjects could distinguish the front sound from the rear sound, they turned the chair to face the direction of the sound source. For the simultaneous sound condition, almost no subjects could face the correct direction during the first half of the distance as described above. In the second half, however, they could orient toward the front sound rather accurately within +/-5 degrees from the front speaker. For the alternate sound condition, almost every subject could orient in the correct direction at any given sitting position and in the majority of them the distribution of angle taken to front speaker was within +/- 10 degrees.
Sound localization within limited time of exposure to the sound (Experiment 2)

In this experiment, differentiation between two sounds, from the front and rear speakers, was very low except at small angles in case of simultaneous sound at every position in the first half

of the distance. The high rate of the correct answers obtained at small angles was probably dues to obtaining localization clues from the rear sound. In the latter half of the distance for simultaneous sound and at all distances for the alternate sound condition, however, a relatively high rate of correct answers except at small angles to the front speaker was obtained, although the rate of correct answer was significantly high for alternate sound compared to that of simultaneous sound. The lower rate of correct answers observed at small angles to the front speaker found for both simultaneous and alternate sound might indicate that sound in front is better localized when the body angle of the observer is oblique to it. Overall, alternate sound was found to provide reliable clues for orientation taking.

CONCLUSION

The newly developed ATS system that delivers sounds alternately from a pair of speakers located on each end of a crosswalks seemed to be useful for assisting visually disabled pedestrians to cross intersections in the correct direction, both at the beginning and while crossing from one side to the other.

Although this new ATS system was found to be useful for directing visually disabled pedestrians to the appropriate destination by sound clues, further studies on interference with traffic noise or other disturbances in real walking situations are required. It is also pointed out that in the middle of the presumed crosswalk, the loudness of sounds from two speakers becomes close and supposedly makes ones difficult to differentiate of one sound from the other. To solve this problem, we are now modifying the new ATS system by changing the sound signals emit from a pair of speakers and this would increase auditory contrast and might help users to identify front speaker more easily.

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TOUCH, PHYSICAL CONTACT, MOVEMENT AND OTHER CHILDREARING PRACTICES IN ETHIOPIA WHICH HAVE A POSITIVE INFLUENCE ON THE DEVELOPMENT OF A BLIND CHILD (YALATAHU), A CASE STUDY

EVIE ROTE
Ofarim Unit for the Blind
Hannah Khoushi Child Development Center
Bnai Zion Medical Center
Haifa, Israel

David Warren from the University of California spoke about the development potential of blind and visually impaired children in his keynote speech at the International Conference on Mobility in Norway, 1996. He stated that normative research underestimates their potential, and thus "handicaps" their development. Instead we should be looking for the variables that effect development positively. The demands and the opportunities of a child's environment have more influence on his development than his visual impairment. We compare blind children to the average norms of sighted children, but the lack of vision itself is not the reason for developmental differences. Warren believes we do not expect enough from blind children because of the charts and tables comparing their development to sighted children. He believes research should look into the well-developed blind and describe the factors influencing their good development.

For this reason I have chosen to look at the development of Yalatahu, a blind 4 year old new immigrant from Ethiopia. He has lived in Israel for 9 months in a caravan complex in Haifa and he is the youngest of 11 children in a single-parent home. He is anopthalmic, born without eyes.

Although there are many other intelligent, motorically active children in our Ofarim groups, children with creative imaginations, busy socially, and successfully integrated in their neighborhood preschools, Yalatahu was different.

Unlike other blind children in our preschool groups, Yalatahu was never in a formal education setting, nor had he any early intervention or professional contact. Yet he is very well developed, self-confident, assertive, and very social. He has beautiful posture, and has no blind mannerisms. He has a fantastic sense of space and moves as if he can see. He is curious, willing to try everything, and has no tactile defenses. He is bi-lingual, and is very independent.

Trying to understand factors contributing to his outstanding development, it is important to look at the Ethiopian culture, their beliefs, and values. The extended family is very close. Uncles are seen as fathers, cousins as brothers. Children are highly valued and seen as gifts of God. Children are future financial assets as an insurance policy for providing care for their elders. Parental goals for children are centered on social and human values: respect, self-reliance,

being helpful, co-operative, and obedient. After birth there is a period of confinement for both mother and infant, designed to allow the mother to regain her energy, and to protect the baby from disease. It is the time for the development of bonding and attachment between mother and child. The mother does nothing but eat, feed her baby, and attend to his needs. The naming of the child is a significant event, a celebration. Names have meaning and are chosen carefully to describe the child. Boys are named after 40 days and girls after 80 days which is also the length of confinement and rest. Yalatahu means, “God gave him everything, but eyes.” His mother believes that his intelligence is a compensation for the loss of vision. His name encompasses the family’s acceptance of Yalatahu’s blindness. Mothers breastfeed their babies up to three years, carry the child on their backs, and sleep with the child.
The child is never alone, while it is common practice in modern societies for babies to spend some time unattended. Older children help in the care of younger children. Yalatahu has 10 older siblings, so he never lacked attention. Since all infants are carried on their mother’s back and stay with her during all daily activities, the blind child isn’t at as much of a disadvantage as a blind child in a modern society in which the contact is much more visual than tactile. For example, Ethiopians eat with their hands enabling the child to touch and explore new and different textures. There is no formal education especially in the rural areas, nor are there outside caregivers, besides the family. Learning occurs by modeling adults and older children. The Ethiopian culture is very accepting of each child as an individual, giving positive reinforcement based on ability. Parents are not frustrated that a child is not functioning at age level.

How do the Ethiopean child-rearing practices affect the physiological, emotional, cognitive, and social development of a blind child?

Yalatahu learned about movement, posture, and space through tactile and kinesthetic stimulation. While being carried on his mother’s back his muscle-joint receptors integrated the actions of his mother’s body with his own. He learned how to hold his head, and shoulders through the vestibular system, in the inner ear. In a vertical position on his mother’s back he learned to keep his head balanced when she bent over or did any other movement during her daily activities. He had to correct his position and right himself. He received more vestibular stimulation than a blind child in a modern society. Through kinesthetic stimulation he learned about body parts and how they work together and move through space. The book Touching, by Ashley Montagnue, examines the significance of skin our largest organ, and tactile stimulation, our most fundamental sensory input. It questions whether in modern American society of 1978 there is enough early tactile experiences for its young, compared to other cultures. Most of the time Yalatahu had skin contact with his mother while being carried on her back under her clothes, needing no clothes himself. His sense of touch is very developed, sensitive and accurate.

Psychologically, Yalatahu formed a very strong attachment with his mother. Klaus and Kennel talk about bonding and attachment after birth. They claim that the infant and mother should be left together to continue to develop a “symbiotic” relationship critical to both. This close relationship is fostered in the time of confinement, “beit nida”. Because Ethiopian children sleep in close contact with their parents, they never need pacifiers, or have sleeping problems.

Closeness to a responsive mother makes the child secure and confident, building a basic trust in the environment. Nursing is not only nourishment, but insures frequent body contact with the mother who is best equipped to meet the child's emotional needs. Demand feeding gives the baby the feeling the world is his for the asking. It gives him a feeling of control and confidence that he can influence the behavior of others.

Cognitively Yalatahu has an excellent memory for people, voices, names, and events. In the Ethiopian village where it is unusual for children to attend school, the adults teach children orally. From the mother's back children learn about places, and associated sounds. Yalatahu in his 9 months in Israel, has learned beautiful Hebrew, is bi-lingual, and understands what it means to translate.

Yalatahu's mother verbally corrects him if he does something wrong and gently helps him from the back with her hands guiding his, if he is unable to do something by himself. She encourages his motor activities, giving him the time to cope with and solve problems, without being overprotective. Apparently Ethiopian mothers have early motor milestone expectations that predate our norms, while they expect cognitive milestones later than ours. For example the concept of number is difficult for Yalatahu.

Socially Yalatahu is use to being around many people, and recognizes the voices of everyone he meets. He is part of an extended family, and is very interested in what is happening to each person. Blindness can isolate a person, but Yalatahu is constantly reaching out and socially involved. Yalatahu has an excellent body image of himself and is defining his identity, both as a blind child and as an Ethiopian child. He asks about whether other children's eyes are open, meaning, can they see? He asks if his teacher is "ferangi", a stranger, not Ethiopian.

Other professionals working with blind Ethiopian children, all comment on their beautiful movement, posture, orientation in space, and good social skills. Working with Yalatahu has led me to the following questions: When a child is born blind does he need even more tactile, kinesthetic, and proprieoceptic stimulation than is normally given to a baby in a modern society? What can we learn from the child rearing practices of Ethiopia that would encourage better motor development, and posture, more effective tactile receptors, a better sense of space, balance, and self confidence in the blind child? Is it possible to integrate cultural norms from one society into another society?

In my experience working with blind children, Yalatahu's motor and social skills stand out as unusually well developed. It may be that he is endowed with these gifts or that it is his mother within their culture that has influenced his development. I have seen other children with exceptional abilities in music or math which have reflected their home environment and what they received from their parents.

It could be that the close physical contact between mother and child, mother's complete acceptance of Yalatahu's blindness, her belief in his abilities, her teaching through modeling and giving him a variety of tactile experiences are some of the secrets of Yalatahu's exceptional development. These principles adopted by other parents may prove valuable in enhancing basic strengths on which later development can advance more affectivity.

AFTER JULIE & MELISSA: TEACHING ORIENTATION AND MOBILITY TO YOUNG STUDENTS IN BELGIUM WILL NEVER BE THE SAME

ANNE KELLY-EVRARD, COMS
Institut Royal pour Sourds et Aveugles (IRSA)
1504, chaussée de Waterloo
1180 Brussels - BELGIUM

INTRODUCTION:

Belgium is a small country squeezed between Holland, Germany, France and the tiny Grand Duchy of Luxembourg. With its 10 million inhabitants confined to a small area, it is one of the most densely populated countries in the world. It is a culturally rich country because of its history. Before declaring independent, it was a territory which was invaded successively by Romans, the French, German, Dutch and Spanish peoples. In 1831, Belgium became a hereditary constitutional monarchy, a kingdom which is divided into three regions where the three official languages are French, Dutch and German.

Because of the cultural differences, we can find a wide range of architectural designs which vary from one city to another or even, from one area to another. Eight years ago, I returned to Belgium from getting my education at Boston College where I learned that orientation is easy, because as I was taught, to get from A to B you simply go 2 blocks North and 3 blocks West. Well, it was formed a real challenge for me to apply this principle I had learnt in my old country where people look my braille compass and say " what a funny watch you're wearing!". But more recently, I had to reassess my approaches further in the light of some recent tragic events.

JULIE, MELISSA, AN, EEFJE, LOUBNA AND CO.

In June 1995, two eight year old girls, Julie and Melissa disappeared while they were walking not far away from home in the Belgian countryside. In August 1995, another two, An and Eefje who were not the same age but teenagers and who came from the opposite side of the country as the first two girls, disappeared. In February 1996, another young girl was kidnapped while she was out cycling. In August 1996, a teenager of 14, also suddenly went missing. All of them were kidnapped in different regions of Belgium.

For 14 months the parents searched desperately for their daughters, going for interviews on T.V., appealing to the population for help, not only nationally but also worldwide. For more than one year, everybody became involved in this extensive national search. At the same time, a deep feeling of xenophobia developed and it became unacceptable for parents to allow their child to walk alone. Late in the summer 1996, the police caught the kidnapper, Marc Dutroux in his house and found two girls still alive. A few days later, Dutroux revealed where he had buried Julie, Melissa, An and Eefje. The story of the end of their life was a terrible nightmare which put most of the country in a real state of shock.

The media played a big part in making the general public aware of the reality behind the facts. All this was not just the work of a criminal, but with it came the discovery of many pedophile nets operating under the protection of some politicians. The feeling of a lack of Justice moved the whole country.

On October 20th 1996, this sense of public outrage, culminated in a massive demonstration. In a show of solidarity rarely demonstrated among different linguistic groups in Belgium, 350,000 people all dressed in white and took the streets of Brussels, walking slowly and silently to protest against the Belgian juridical system. We called it “La Marche Blanche”.
Today, while we are still waiting for the trial of Marc Dutroux and his accomplices, we are learning daily about new scandals relating to paedophilia.

AS AN O&M SPECIALIST WHAT KIND OF REACTIONS I HAD TO DEAL WITH AFTER THESE TERRIBLE EVENTS?
The following is about feelings and experiences I went through with not all but a significant number of my students since September 1996. Working as an O&M specialist in both educational systems - special school for the blind and mainstream schools, I found the reactions of the situation more strained for the students who attended the regular school system. Only 25% of the students who were in the special school were involved in the new approach.

For a better understanding of these specific O&M strategies and new approaches, it is important to distinguish between the three groups of people who reacted to the events. By which, I mean the children/ teenagers, the parents and myself.

THE VISUALLY IMPAIRED STUDENTS.
Marc, 11 years old and totally blind, was an outgoing and open-minded boy always making jokes, surrounded by many friends. Since he had started his O&M program in 1994, he had become a very popular member of his community. A real star he was!! For example, whilst learning the route from home to his school, he used to send a greeting of “ Hello Madam, how are you doing today?” to any woman he would hear, walking in her high heals on the other side of the street. Actually that lesson where I put physical distance between us was his favorite.

But Marc loved and still loves listening the radio and especially the news. He was 8 years old when Julie and Melissa were kidnapped, from the same area where he lives. This little smiling boy became very anxious, blindisms surfaced more frequently, and his funny jokes became very cynical. He started to change his attitudes towards our O&M objectives. He didn’t mind his O&M lessons such as new cane techniques or environment analysis where I was standing next to him to teach these skills, but he rejected learning any new routes unless I was close enough to him to touch for reassurance. At the sound of any pedestrian coming towards us, or a car door shutting, Marc would just freeze and gripped me very tightly. Marc wasn’t the only one who changed his behaviour towards his Orientation and Mobility program. He was so nervous and so too were many other students, in particular teenage girls, I spent more time in my lessons discussing with them how to deal with this new stress. Again, not all my stu-

dents went through those changes in behaviour. Their reactions depended largely on their personality, their interest in the news, and their environments.

THE PARENTS:

In September 1995, a couple months after the first kidnappings, and when I was supposed to start teaching the new O&M objectives as listed in the yearly report sent to the parents every June. Some of them wanted me to meet them to readjust the O&M goals we had set up together three months before. For example, Marc's father, who made a special request in May 95, no longer wanted his son learning the route to get to the bakery.

Throughout the following academic year, we were watching, hearing and listening to the missing children's parents despair at not finding their child. At the same time, I had to deal with the evergrowing stress of the parents of my blind students.

In September 1996, after the discovery of the bodies, more parents expressed to me their panic and concern about the O&M application of the skills outside of the lesson. Their fears were justified and in great part based on how they perceived their children's vulnerability. For example, they spoke about their children's inability to flee from danger, or their lack of physical defense to protect themselves from such danger. Self-defense became a major issue. Some of the parents ask me to stay closer to their child during the O&M lesson. Also they asked me to drop some of the O&M goals we set up the year before, because of their fears about some of the streets their blind child would be walking on. But they <u>never</u> asked me to suspend the O&M training.

AND MYSELF:

Like most people in Belgium, I was in total state of shock when I found out what had happened to the little victims. But I was already more concerned about the circumstances of the kidnappings: one or two children (the youngsters were 8) walking in a familiar area, not far away from home and during daytime, without an adult supervision ..that sounded just like some of O&M final objectives I usually set up to most of my students. For me, it was no longer simply a case of teaching new cane techniques or orientation skills but also of how great my responsibility was if anything should happen to one of the 40 students I work with each year. On the one hand, I'm totally convinced of the importance of giving O&M skills to visually impaired students, but on the other hand, I do understand the parents' fears.

As far as the students and the parents are concerned, I found that my attitudes as an O&M specialist had also changed too. And not only for those one who expressed their fears but also towards all my students. For example, when I'm observing one of my students from a distance travelling along a route, I'm always checking the environmental clues around him /her to see how he/she will deal with them. Also, while they're crossing a street my eyes are normally shifting from one road to the other to verify my student's direction to be sure the crossing is safe. Well, now I'm also checking, the appearance and behaviour of the people the child encounters on his/her way. I observe the license plate of any car slowing down close to the child, and I'm quicker to approach my student to help him/her to calm down if any panic feelings set in.

NEW O&M STRATEGIES OR APPROACHES:

Before listing the specific O&M approaches, it is important to mention the creation of some very interesting initiatives addressed to all children in Belgium. First, an extensive campaign to sensitise people problems or how to react to dangers. Most of that work was organized by the school teachers, or some specialized teams of psychologists who were invited to the class to talk to the children. To help the parents take part in this campaign, different very good books came out like the "Mimi Fleur de Cactus et son herisson".

The following is by no means an exhaustive list of strategies for all the blind community, but it represents what I tried to set up for the visually impaired individuals and some of their parents so that it would make more sense for me to keep on teaching O&M skills.

THE VISUALLY IMPAIRED STUDENTS:

Assuring the parents of its good benefits, three of my students started to go to a local Judo class for self-defense. Besides enhancing their self-confidence, those boys have developed a much better body posture control and seem to deal better with a stress situation. For two of them, the route to the sportshall was a new O&M goal.

We also worked towards a better control of the environment. Because of his attacks whenever heard somebody coming towards him, I taught Marc to address a Hi so that he could recognize straightaway from the response who is it and where was the person situated in relation to him. Together, we analyze each situation, how far and which direction the person is or why a car is slowing down next to him, whenever he is approaching an intersection, a parking lot or a gas station.

I also spent time with some of my students practicing screaming "help" as loud as they could. This was possible if we could go to an area like a field or some other remote location. For some them, this kind of vocal exercise was a real challenge. They had difficulties controlling their breathing in relation to their poor body postures. One of them carries at all times a whistle for emergencies.

I bought a personal alarm or screamer and I explained to my students how to use it. To re-establish the physical distance between the student and myself, I used a Walkie-Talkie as a means of communication in my O&M courses.

In collaboration with a psychologist, I organized a "mobility meeting" with all my students and encouraged them to talk about their fears and the way each one developed his own tricks to cope with the situation.

THE PARENTS:

I now invite the parents more frequently to observe the O&M lessons, not only to watch their child getting mobile but to see how much the general public is very concerned with helping him/her.

I strongly advise the parents who are stressed to consider purchasing a cellular phone for their child: in Belgium, however, it is still an expensive tool to put into in a child's hands.
During a parents' meeting about mobility basic techniques I was giving last year, I encouraged the parents to exchange feelings about their fears for their child's mobility.

AND MYSELF:
In some of individual O&M programs, my objectives changed somewhat.
At the beginning of the crisis, I spent more time practicing work indoor skills like spatial representation of different environments and map readings than I had initially planned.
Also, I devoted much more time at the Hines break technique to ensure the student had a better control of the sighted-guide technique.

I modified some of the planned routes because of the environment, or suggested them to take alternative routes depending on the time of day.
I need to have more meetings with our psychologist to talk about the student's reactions and my response to them.

CONCLUSIONS:
Eventhough, I remain absolutely convinced of the great benefits of teaching O&M to young visually impaired students, what happened to Belgium three years ago made me wonder how far I was prepared to work the independence of my students. I do not yet have any answer to this question, but I count on the time to erase slowly this deep emotional wound and restore a sense of security when walking in the street, whilst never forgetting what happened to Julie and Melissa. Time is a great healer. Or as Veuillot wrote : “Il y a des choses qu'on ne voit comme il faut qu'avec des yeux qui ont pleuré”.

USING VERBAL AND PHYSICAL PROMPTS TO TEACH THE USE OF A LONG CANE TO A STUDENT WHO IS VISUALLY IMPAIRED AND HAS ADDITIONAL SEVERE DISABLITIES

DUNCAN MCGREGOR
The York Region District School Board
300 Harry Walker Parkway
Newmarket, Ontario, Canada L3Y 8E2

NORA GRIFFIN-SHIRLEY
Texas Tech University
College of Education
Box 41071
Lubbock, Texas 79409-1071
USA

Orientation and mobility is the task of teaching persons with visual impairments to move independently, safely and purposefully through the environment (Welsh & Blasch, 1980). Persons with severe multiple disabilities have the same need to move about safely and independently as anyone else. However, traditional orientation and mobility techniques, and traditional methods of teaching those techniques, do not address the needs of those persons who have severe developmental disabilities, in addition to their visual impairments (McGregor, 1995).

A single subject, multiple treatment design was used to determine whether adolescents with severe visual impairments and severe developmental disabilities could be taught, by means of verbal and physical prompts, a modified cane technique that would allow them to travel independently in a familiar indoor environment.

The subjects were four female high school students, between the ages of 17 and 21, who were severely visually impaired and had severe developmental disabilities. Although two of the subjects had physical disabilities as a result of cerebral palsy, each subject was ambulatory and capable of holding onto the grip of a long cane with her dominant hand. The subjects had not previously received any training in the use of the long cane.

Intervention occurred in the hallways of each subject's school. Subjects were provided with canes of the appropriate length, with marshmallow tips. Each subject had a functional purpose in traveling the route, so that she was reinforced at the end of the route, either with a tangible reinforcer, such as a drink from a soft drink machine, or with an activity that the subject enjoyed.

The goal of this intervention was to increase the subject's independence in moving about the school, by teaching her to use a modified diagonal cane technique. In order to be independent

in the use of a cane, a subject must hold onto it over the duration of the route and maintain it in a position in front of her that will afford a degree of protection. The method of grasping the cane, and the position of the cane should approximate those specified for the standard diagonal cane technique.

Interval recording was used to determine the percentage of time, during each session, that the subject was exhibiting the target behaviour. In the baseline and first intervention phases, the target behaviour consisted of holding onto the cane while walking the route. In subsequent phases, the target behaviour was modified to include grasp and positional components, as the subject's technique was being shaped to approximate the standard diagonal technique. When the subject dropped her cane, held it with an inappropriate grasp, or moved it out of the prescribed position, a verbal and then, if necessary, a physical prompt was given. Verbal prompts were in the form of commands such as "______, pick up your cane", or "______, cane down." Physical prompts, following a period of "wait time" (5 seconds for picking up cane, 2 seconds for grasp and positional corrections), consisted of gentle, hand-over-hand guidance to pick up the cane, hold it with an appropriate grasp, or place the tip on the floor, etc.

During the baseline phase, the subject was given her cane at the beginning of the route, and assisted in grasping it appropriately and moving it into the diagonal position. She walked along the route toward the voice of the instructor. If she dropped her cane, it was simply given back to her, with the appropriate grasp and position. The percentage of time she held onto her cane was calculated (number of 5-second intervals cane held continuously ∏ total number of 5-second intervals in session 100). If the subject did not hold onto her cane for at least 90% of the intervals during each session during baseline, in the next phase, if she dropped her cane, she was required to pick it up before she could continue walking. Once the subject held her cane 90% of the time over three consecutive sessions, during either the baseline or "picking up cane" phase, the shaping procedure began.

The position specified during each phase depended upon the subject's performance in previous phases. The precise criteria for each phase varied for each individual; however, in general, positions were to be mastered in the following order:

1. Cane held with appropriate grasp.
2. Cane tip in contact with the floor.
3. Cane tip in front of the subject and within an angle of 90 ∞ to either side of midline.
4. Cane tip in front of the subject and within an angle of 60 ∞ to either side of midline.
5. Cane tip in front of the subject and between midline and an angle of 60∞ to the left of midline (or right, if subject is left handed).

With each subject, the intervention resulted in an increase in the percentage of intervals in which the target behaviour was exhibited.

The study established that the verbal and physical prompts were effective in teaching four adolescents, with severe visual impairments and severe developmental disabilities, a modified diagonal cane technique that would be functional for them in travelling independently in a familiar indoor environment.

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A PRACTICAL SYSTEM FOR THE REALIZATION OF MOBILITY MAPS IN RELIEF

LAURA BLANCO ZÁRATE
O.N.C.E. Administrative Management ForTarragona
Tarragona, Spain

INTRODUCTION

Mobility maps constitute a fundamental working tool for Orientation and Mobility specialists when transmitting and teaching our students spatial concepts and relations, and when helping them to create cognitive maps and in their understanding of spatial configuration of specific areas.

Due to its great didactic efficiency, as of the 1970's when Armstrong carried out his work on "Mobility Maps", the use of such maps in relief among specialists in Orientation and Mobility became generalized and thus there was an increase in the research into the different possible forms of producing them, the materials used, reproduction methods and the most adequate symbology and so on.

Today, there are many systems of production and reproduction of mobility maps available on the market, some are portable such as the drawing board with lines in relief, but the majority of production equipment offer materials which allow for the creation of master matrices such as the map Kit of the Royal National Institute for the Blind (GREAT BRITAIN) or the American Printing House for the Blind's Tactile Graphics Kit.

Thanks to a reproductive machine (Thermoform, Ricoh Fuser, Tactile Image etc.) we can make copies from these matrices. The most ideal system is chosen in order to create each plan in relief according to the characteristics of the student who is going to use the plan, his own personal objectives, the area represented, the number of people who are going to use it and the time available to the specialist in Orientation and Mobility.

The creation of these master matrices involves hard work for the Orientation and Mobility specialist since it requires planning time, the choice of the materials to be used, the confection of the matrix of the use of equipment for the elaboration of the relief plans which must later be reproduced with a machine which must be located physically close to us.

Another significant difficulty which we have had to face with this production equipment of plans is the fact that they use a symbology which requires previous learning by the student, which is difficult for many of our students who are of all ages and intellectual levels. The use of these systems is ideal for creating maps in relief of areas which will be used by several people but in our experience, and due to the fact that the population which we serve is very widely dispersed geographically, often the plan is only used by one person, or is only used in one or two sessions. Likewise, the fact that these systems must be prepared in anticipation, limits the pos-

sibility of being able to offer an immediate solution to the problems which sometimes arise when giving a class: the realization that a student has a misconception which must be clarified, the configuration of a new route, etc.

For all of these reasons, we consider the necessity of having an alternative system available or a system which is complementary to the traditional methods of the elaboration of plans which will fulfill the following aims:
-it must be portable.
-it must allow for the rapid construction of the plan of a real or an imaginary zone.
-it must be useful for working with students at different conceptual levels.
-it must be useful for working with the same student in different stages of the program.
-the symbology employed should not require its previous learning but should be figurative, that is to say, it should use easily recognizable elements being similar to real elements.

A SYSTEM OF PRODUCTION OF PLANS WHICH IS COMPLEMENTARY TO THE TRADITIONAL ONES

To provide an answer to our necessities in this field, we designed a portable case of 35 x 47 cm., padded on the outside with a textile fiber. Once open, this case is placed on a table and its outside forms the base of our plan measuring 70 x 47 cm. On the inside of the case is a removable box with several compartments in which the pieces and elements for the configuration of the relief plans are found, belonging to four conceptual levels:

1. The concept of the block: this consists of a model or three dimensional representation of a block with the most common fixed elements which may be found on the sidewalk: a street lamp, a bench, traffic lights, a tree, a subway station... This is at 1:100 scale.
2. Types of blocks and crossroads: these are two dimensional representations of the blocks and there sidewalks and the different types of corner we may encounter. This level is useful for working on the understanding of the different types of block, traffic, road crossing and corrections which must be made at these points. It includes traffic lights, cars and pedestrian crossings.
3. Maps: of mobility, in order to understand the itinerary or route or the configuration of a specific area. In order to make this, we have pieces with the most common shapes of blocks (17 different forms, green zone, a square with gardens, a junction with a pedestrian crossing, a junction with traffic lights, an important building, a central walkway, a river, a railroad track and a bus stop.
4. Schematic plans of an area or town: these facilitate the acquisition of a schematic image of the area or town, the location of the main streets and their positional relationship. For this we have different length bars and symbols of squares.

The materials with which we have produced this case are stable: wood for the case, methacrylates and polyvinyl chloride for the parts.

Most of the pieces stick to the base using velcro although some elements are stuck by fixing them into the base of the plan (such as traffic lights). We have tried to make the colors used

contrast with the base so as to be of greater help to those people who have residual vision.

In Spain, the Orientation and Mobility specialists who do not work in a rehabilitation center or in a school attend to the necessities of the population of a determined area. Given the wide age range of our students, their geographical dispersion and the little time available for the preparation of adapted materials, the availability of a work tool like this most versatile portable work station is of great use to us since we can, in a question of minutes, study a spatial representation of crossroads or configure the physical surroundings of the student.
This new conceptual design in the elaboration of plans in relief is not a substitute for the rest but is complementary to them. Currently, it is in the phase of improvement with the aim of bettering the materials which make it up and of reducing the weight of the case. Nevertheless, this is another step towards finding practical systems for the creation of mobility plans in relief.

Laura Blanco Zárate has a degree in psychology and is a Rehabilitation Technician for the blind and the visually impaired at the National Organization for the Spanish Blind - O.N.C.E. where she has been working for ten years. She has collaborated closely with the Rovira i Virgili University of Tarragona, Spain by giving several seminars to the students of physiotherapy and pedagogy. She has also given presentations at the I State Congress to be held in Spain and at the VII International Mobility Congress held in Melbourne, Australia.

A QUEST TO UNDERSTAND THE ASSOCIATIONS OF FACTORS THAT ENHANCE THE ORIENTATION AND MOBILITY OF BLIND HIGH SCHOOL STUDENTS

JAY TASKA
Department of Special Education
Scottsdale Public Schools
Scottsdale, Arizona, USA

There are many unique factors that enhance the orientation and mobility of blind high school students residing in the Phoenix metropolitan area. This particular research project focuses on a retrospective study of informational profiles on ten visually impaired students who currently attend high schools in Maricopa County, Arizona. Demographic characteristics including interviews and observations aimed to ascertain how well, in what method, where, and how often these ten students traveled are compared in order to determine significant associations which may exist between these variables.

A design utilizing the naturalistic inquiry paradigm was selected for this research. The researcher approached the question of what unique factors enhanced the orientation and mobility of blind high school students using a wide array of conceptual and methodological tools. The array involved observation, interview data, characteristics and constant comparison of that data which was collected. The open awareness research design gave multiple perspectives and longitudinal dimensions to the data. The generalized nature of this approach provided for a more practical application because of the on-going accumulation of data. With this strategy, the researcher could hear and see the research, relate it and then apply it.

Since this inquiry method is hypothesis seeking instead of hypothesis testing, orientation and mobility research was an excellent avenue for application. By taking into account the many socio-psychological factors involved in this specific research area, the researcher was not restricted to providing or disproving a pre-set theory. Variables could be studied and then correlated with existing data to provide understandability and scope of program. The data required concentrated and systematic effort by the researcher to find connections within the data, and organize these connections into patterns, themes and categories of analysis. It is important for the researcher to notice changes in what is reported, and find the relationship of changes to what remains constant.

Control is maintained as the system allows the researcher to understand and analyze environmental situations. By using different data collection techniques and evaluation research strategies to study the association of variables, triangulation procedures come into play and contribute to the overall verification and validation of the analysis of data. This is done by comparing the consistency of findings generated by different data-collection methods and by checking the different data sources within the same method.

Due to the flexible nature of this inquire paradigm, research findings and applications become more personal and the research model can be implemented in other environments.

The mobility information resulting from the available data collected was great. It was also diverse. The large majority of students in the study sample had very personalized patterns and habits of travel. Generally, the subjects could all be classified as “independent travelers” in familiar environments. Yet, one cannot assume that an “independent traveler” classification around a student’s own neighborhood or at one’s old elementary school setting implies total independence. Typically, the personal O&M abilities of the students fell along a continuum from dependence to independence based on the individual student’s understanding, desires, additional disabilities and experience.

The professional services of instruction in orientation and mobility provided to this age group appeared to average one hundred and twenty minutes per week. However, those students with the greatest degree of independence in travel had received almost twice the average amount of guidance from a specialist in the field of mobility prior to beginning their high school experience. Also, it should be noted, that there was a positive association between the level of skills in pure cane technique and the amount of mobility instruction a student previously received.

The instructors who worked with the study sample all taught route travel skills across a wide range of environments. Practice took place from simple to complex settings. Lessons utilized semi-independent or independent levels of travel in familiar indoor, residential, semi-business and business environments. These levels reflected the requirements of independent travel training. They were based on task analysis of skills required to achieve an ideal level of functioning, i.e., traveling in any environment, familiar or unfamiliar, by foot, public transportation, or both, with minimal assistance from others.

The interpretation of data showed “ideal” instruction may actually be important. Although, it may be a somewhat smaller piece of the puzzle when viewed in total relationship to the way high school blind travelers function.

The study showed a wide variety of reasons some students with severe visual impairments were unable or reluctant to travel independently. These reasons were not related exclusively to training, actual lack of vision or the presence of other disability conditions. For example, some of the subjects were easily embarrassed in public. Some feared asking strangers for assistance or were unmotivated to make the extra effort required to perform a complicated task.

Due to subtle and not so subtle psychological concerns, many preferred to continue functioning in a dependent mode. A few subjects who were unfamiliar with an area feared getting lost or lacked the self confidence or mental stamina necessary for even simple trips. Some did not know how to use necessary techniques and resources to travel out of their home zone. A surprisingly large portion of the study group was prevented or discouraged from trying to travel independently by parents, family, teachers or friends.

It should be noted that parental fears were discovered to be a major factor in impeding independent travel. Some parental overt feelings were transferred onto the students, making them uncomfortably “stiff” in complex travel situations. This inhibited student abilities to optimally utilize resources for safe and efficient movement.

Human feelings are, and will continue to be real impediments to independent travel for many persons with vision challenges. Future thinking must take into account those dimensions of mobility instruction which effectively deal with these multiple problems. Orientation and mobility instruction for the visually impaired has been successful because it has structured learning experiences which continuously address changing needs. The impact of a blind son or daughter on a family system and the family impact on the blind child cannot be overlooked.

The data showed clearly that gender can be a large factor. Female travelers’ parents tended to be overly protective about independent bus travel. Even foot travel in the winter/shorter daylight months and evening routes were extremely restricted for this group. This population tended to use Dial-a-Ride services much more frequently than the male travelers.

Other patterns that emerged included various degrees of personal motivation, ease and accessibility of the route traveled and intrinsic levels of adventure to travel. It can be said that if a student had a good enough reason to travel to a destination, that student would find a way to get there. The levels of independence correlated with the amount of past travel, within a very small geographic zone, about the students’ home and school neighborhoods. The proximity or nearness of a student’s home to a store or shopping area, again, was a major indicator of the amount of travel to this destination.

Although intelligence per say was not measured, the students who had high grade point averages did not consistently have the best skills, techniques or travel independence. Juniors and seniors with more maturity and experience seemed to be more confident and had more motivation to travel. Also, students who lived near city bus lines used those services with much more frequency, especially bus routes which had extended evening and weekend service.

To some of the subjects, mobility instruction seemed primarily concerned with teaching the use of a mobility device; a long cane used to scan the environment and take in necessary information. This view of the process lead some to think that the future of this service (i.e., O&M) was linked to the development of more appropriate electronic devices designed to supplement or substitute for current methods of scanning and that these devices would be distributed and used by visually impaired persons to get around as easily as everyone else. While there may be individuals for whom this is true, this conception overlooks some very basic dimensions of current mobility instruction that will continue to be necessary in the future.

There is a great need for more investigation into the quest to understand the association of factors that enhance the orientation and mobility of blind high school students. Much of it could be done over time with numerous participants, using these data collection methods. These methods could also be used for goal setting and investigating the outcomes of programs that schools provide to students and their families; leading to the attainment of total independence and therefore important changes in the quality of the visually impaired student’s life.

HISPANIC FAMILIES' PERCEPTION OF ORIENTATION AND MOBILITY RESEARCH BRIEF

TASHA L. DEAN

The purpose of this study was to investigate how Hispanic parents' perceptions may contribute to or hinder their children's orientation and mobility training program. Further, it was hoped that this study would result in understanding independence and visual impairment, as perceived by Hispanic parents; and which when included in orientation and mobility (O&M) training programs by O&M specialists, will increase Hispanic parents' understanding and support, as well as increase their visually impaired child's success in O&M. The study was conducted in Southern California and focused on Hispanic parents of visually impaired children, 8-12, with no additional disabilities. The findings reported here are part of a larger study conducted by Dean (1998).

This descriptive study was designed with the purpose of taking a step closer to answering and understanding the above issues, and to seek answers for working with other culturally and linguistically diverse children and their families.

Families participating in the study resided in Southern California and were between 26-46 years of age. The median age of parents was 36.8 years of age. Families interviewed were asked to provide information in four major areas. One area included 25 items related to family and child characteristics which will be discussed below.

The visually impaired children represented in the study ranged in age from 8-12 years and 61.2% were female and 38.8% were male. The median age of children was 11.9 years of age. All students were identified as having only a visual impairment, and 7 (38.8%) were identified as having Retinopathy of Prematurity (ROP).

The information reported by families indicated that 80% of the children's visual impairments were recognized before they were one year old. In addition, 72.2% were born in the United States and a slightly larger first generation percentage than those reported by the Bureau of the Census.

Fifteen mothers, 2 fathers, and 1 mother and father, were interviewed. The majority of the parents reported having less than a high school education and 3 had college degrees. Thirty-three percent of the families reported incomes of less than $12,000.

The gathered information on the families points to a group of families, whose demographic characteristics warrant consideration in their children's orientation and mobility training programs.

The three other areas that families shared their thoughts and concerns on are presented according to the research questions of the study and are as follows:

1. Parents perception of required orientation and mobility services.
Parents reported having a basic to in-depth understanding of the required O&M services for their visually impaired children. Unlike other studies that have found Hispanic parents to be less informed regarding educational programs (Correa 1987; Garcia et al. 1995).

2. Parents perception of their children's orientation and mobility program.
Parents in this study had positive attitudes/perceptions about their children's O&M program and their children's O&M specialists. Most parents felt satisfied with their children's O&M program and the majority of parents reported being informed concerning their children's O&M program. Although parents were generally pleased with their children's O&M program, one change was consistently noted by parents. Parents reported desiring more O&M time/lessons for their children.

3. Parents perception of their children's independence.
Unanimously, parents identified independence as being very important to their families and for their children with visual impairments. Parents were asked to rate the independence of their children in four areas: household chores, community, play, and school. Parents rated their children much higher in the area of school.

Conclusion

It is evident from this study that working with culturally diverse students families can be quite challenging. However, professionals like orientation and mobility specialists must develop relationships with families that are equal and collaborative in nature. This study is also encouraging to professionals in seeing how such relationships can greatly improve parents' perception and understanding. As the literature has noted time and time again, (Harry, 1992, Leung, 1993) culturally diverse families who become involved in their children's educational program can help their children make gains that might otherwise not exist. Additionally, orientation and mobility specialists because of the nature of the profession, must empower the culturally diverse family by providing individualized and appropriate training concerning O&M and other areas related to the education of their visually impaired children.

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VENI, VENI, NON VIDI, VICI
Helping Students to Develop Mental Maps And Build Self Orientation Skills

JAY STITELEY & DAVID LOUX
The Seeing Eye, Inc., P. O. Box 375, Morristown, NJ 07963-0375

Effective and efficient independent travel is greatly enhanced through the development of mental mapping skills. To the degree possible, based on the capabilities of each individual, the cognitive map is developed through a process of reasoned expectations. With the acquiring of some personal travel experience and the building of recall and recognition memory, along with an understanding of a personal learning style, the process of deductive reasoning can become the foundation of a versatile and highly useful mental map.

Personal travel experience, knowledge acquired through reading, soliciting information, and the use of visual landmarks and sensory clues in the environment are integrated through the process of deductive reasoning. Developing a mental map also includes the skill of transferring this information to a new environment and thereby the map, and the mapping process is validated and vital.

Glossary of Terms

1. Knowledge acquired through reading — Many books provide vivid accurate descriptions of architectural styles, structural layouts of rooms, buildings, and general information about "the world around us" by use of shapes, linear dimension, and sight lines.
2. Learning styles — People learn in many different ways. Some may classify their learning style as visual or auditorial and others as kinesthetic. While some may state a preferred style, most people make use of a combination of media and learning styles.
3. Personal travel experience — This is probably the most important piece in building and securing the cognitive map. The understanding of basic shapes such as the (print) letters T, S, and Y, the square, rectangle, and circle, and the ability to comprehend the degree of angles and curves, etc., impact greatly on the map and its usefulness. These are highly linked with learning style and effective use of memory.
4. Recall and recognition memory — Recall memory means that you have already experienced or traveled through an environment previously. Recognition memory is having read or heard a description, or have experienced something similar, while not having direct personal experience.
5. Sensory clues — Emphasizing the use of information perceived by all of the senses is essential to the mapping process. Try to create a general picture of the environment through the use of specific clues such as vehicular and pedestrian traffic sounds, a highway in the distance, restaurant and retail store smells, the sun, railroad trains and tracks, electric doors, inclines and declines, fountains and church bells.
6. Soliciting information — People are a major travel and mapping resource, therefore it is very helpful to recognize the importance of asking questions that will gain more than a yes or no

answer. It is also helpful to use vocabulary or terminology appropriate to the environment you are entering. It can also serve to establish a perceived knowledge base which can strengthen or expand communication; i.e., in a restaurant are we looking at a table or booth, and then, a two top or four top table. Asking airline personnel about the "equipment" rather than the kind of airplane might serve to validate your level of experience.
7. Visual landmarks — We move through a very visually pleasing and stimulating environment and the descriptions of how to reach locations are based on them. When obtaining directions make note of visual landmarks and their locations. When traveling through that new environment, assistance sought along the way will be full of such information as it is the "modis operandi" of the average sighted person. Visual landmarks are still visual landmarks, even if I can't see them!

Samples

In each of the following samples, there is one consistency; when entering the new environment, side step to get out of the flow of traffic, and begin listening and cataloging sounds, their possible meanings, and their location.

1. Cafeterias
Possible sounds; chairs scraping as pulled out or pushed in (also trying to localize the sounds to determine which way the tables are positioned), trays being placed on a rail, clatter of silverware on the tray (this could indicate the beginning of the line), water sounds for the dishwasher, clatter of dishes, silverware and trays altogether could indicate the return window for the used dishes.
Begin walking toward the line sounds; judge distance traveled, pay attention to turns made and how that relates to the entrance of room and then entrance of line as well as exit of line.
Returning dishes after meal; as exiting the food line, listen for the water sounds or spraying noise of the return window. Try to be out at least ten feet from the exit door to minimize crashes with food line exiting people.
2. Fast food restaurants
There are some similarities from one store layout to the next of the same chain of stores, but this is not 100% consistent. This can be used as a point of reference, doing a check off of what fits with the previous map.
Possible sounds; cash register, how close to help determine where the door is to the front counter, crowd noise to indicate possible lines, phrases like, "dining in with us today?", "for here or to go"? (some people answer "to go" so as to get around the matter of handling a tray), cooking sounds like microwaves beeping and fryers bubbling, scraping chairs, trays being set on tables, self-serve soda machines, trash can sounds like metallic clang as the spring loaded lid closes or flapping swing door sounds of wooden trash cans and the banging tray sound immediately above it.
3. Hotel lobbies
Identify the front desk, front door and elevator. These three locations are key to developing the framework for the cognitive map.
Lobby sounds; computer/printer sounds, possibly a deskbell, higher level of crowd noise or phrases like, "do you have a reservation?". These phrases may not be specifically directed to you but can give location information.

Elevator sounds; dings, announcing up or down. If being assisted, confirm the number of elevator cars in the elevator bank, determine if the elevator bank is a dead end or pass through design. This is especially important on your floor. Do all elevators stop at all floors?

WORKSHOP EXERCISE

The list below contains a variety of environments which require varying levels of orientation assistance for the average independent traveler who is blind. For the purposes of this exercise, assume that the traveler has little or no useful vision and is capable of acquiring average or better skills. His/her choice of dog guide or cane is at your discretion.

From the list of environmental cues (which is not meant to be exhaustive), select the three most significant features to aid your traveler in his/her map building and orientation.

Start by declaring your traveler as either a dog guide user or a cane user. Place the corresponding number of the Environmental Cue in the space provided to the left of the "destination".

"The traveler in this exercise uses a _______ as his/her primary means of independent travel."

Eateries—fast food restaurant, fine dining, cafeteria, buffet

Public building—classroom (grade level), bus or train station, hotel lobby, shopping mall
Outdoor environment—city block, sports stadium, rural college campus, suburban neighborhood

ENVIRONMENTAL CUES

1. audible traffic signals
2. backup beeper
3. bells
4. cash registers
5, computer work station
6. conversational phrases
7. crowd control rope/pole/stantion
8. curb cuts
9. doors and doorways (revolving, recessed, vestibule, trap)
10. elevators
11. environment distinctive sounds
12. escalators
13. floor covering/changes
14. fountain
15. front desk
16. furniture (table, chair, sofa)
17. hallways
18. ice machine

19. information counter
20. kitchen sounds
21. noise level changes
22. plants
23. security check points
24. serving counter
25. smells
26. sound reflection (echos)
27. stairs/steps/ramps
28. telephone
29. television/music source
30. traffic
31. vending machines
32. ventilator
33. walls (short,curved,etc.)

THE BUDDY ROAD KIT: A TOOL FOR BUILDING ENVIRONMENTAL CONCEPTS

STEVEN LA GROW
School of Health Sciences
Massey University

JULIA BUDD
Royal New Zealand Foundation for the Blind
Palmerston North, New Zealand

Basic spatial and environmental concepts are essential to orientation and mobility (O&M) and are developed through the child's interaction with the environment (Hill, Rosen, Cornea & Langley, 1984). The child's effectiveness in doing this is dependent, at least in part, upon the richness and variety of perceptions available to him or her. As one would suspect, visually impaired children are somewhat deficient in concept development compared with their sighted peers (Warren, 1984). They lack the richness of experience which can be gained both directly and indirectly (i.e., via books, television, movies, CD Rom, etc) by sighted children. Thus, they require a good deal of specific instruction and assistance in this area (Ferrell, 1979).

Spatial concepts include positional concepts, concepts of shape and form, concepts of measurement (distance, size and weight), knowledge of self to object relationships and knowledge of object to object relationships, as well as, action concepts (e.g., moving forward, back, to the right and left). Large-scale spatial concepts (e.g., space that surrounds and requires one to move around to fully comprehend it) must be formed before the child can thoroughly develop accurate environmental concepts. Environmental concepts include the identification of important objects (e.g., foot paths, streets, intersections, cross walks, blocks, parking lots, private and public buildings, shopping areas, etc.) in the environment, knowledge of the function of these objects, and a working knowledge of the layout of large-scale built environments (La Grow, 1998).

The Buddy Road Kit was developed as a tool for teaching environmental concepts to visually impaired children. The kit is a three dimensional, interactive, wooden model made in cooperation with Players Puzzles, a local toy maker. It consists of numerous pieces representing streets, footpaths, cross walks, boulevards, intersections, and traffic control devices, as well as, wooden blocks to represent houses and buildings. A standard Kit consists of 70 pieces. The pieces may be assembled by the child to form any number of configurations for (a) exploring various environmental concepts, (b) modelling specific environmental features, or (c) constructing routes and/or neighborhoods. Kits may be put together to develop as large and complex an environment as one wishes. Matchbox cars and Lego figures may be used with the kit to represent pedestrian and automobile traffic. The Lego figures are also useful for representing the child's relative position in the environment.

The kit was used to teach a number of concepts to four visually impaired children ranging in age from 7 to 10 as a means of assessing its effectiveness as a teaching tool. The children had acuities ranging from 6/24 with reduced peripheral fields to light perception only. The children were taught basic body, spatial and directional concepts before being introduced to the use of the Kit for teaching environmental concepts. There were 51 concepts introduced with the Kit. Twenty for naming and identifying environmental objects, 21 relating to traffic flow and control, and 10 for route planning and execution. Each set of concepts were taught and assessed using the Kit. Their generalization to real environments was assessed, as well.

Method

A changing criterion design was used to demonstrate the efficacy of the use of this Kit for teaching environmental concepts to visually impaired children. The number of concepts correctly identified after each lesson was recorded. Instruction in each set continued until knowledge of all the concepts in that set were demonstrated. The next set was only introduced after this was achieved. Thus, the criterion for moving from one set of concepts to the next was set at 20 and 41 concepts correctly identified respectively. Each child's progress was recorded and their movement through the teaching program individually determined.

An environmental probe was also used to test the child's knowledge of these concepts prior to using the Kit and after knowledge of each set was demonstrated. The probe assessed 38 environmental concepts arranged in an assumed hierarchy of understanding that roughly corresponded with the 51 concepts introduced in the Kit. The discrepancy in the number of concepts assessed between the Kit and the probe was due to a need to ensure that the students understood the representation and terminology utilized in the Kit. These concepts included eight used in naming or identifying environmental objects (i.e., vehicles, pedestrian, cyclist, park, traffic lane, give-way sign, stop sign and traffic light) and five required for teaching the concepts involved in route planing (i.e., compass points, landmarks, clues, reference points and destination). Knowledge of these 13 were indirectly assessed in the probe. Each concept correctly identified in the probe was recorded. Assessment was discontinued when two consecutive concepts in the hierarchy were missed or incorrectly identified. Thus, the environmental probe represented the number of concepts correctly identified in a row. This was done to assess the degree to which concepts taught using the Kit transferred to the actual environment. The children were seen in age-group pairs for 30 minute lessons once a week. The lessons were conducted by an O&M instructor in a classroom with the aid of an assistant. No instruction was provided in any other environment or format. All concepts were introduced using the Kit. The children were encouraged to manipulate the pieces, construct environments, demonstrate traffic flow and rules and plan and execute routes. The latter was demonstrated using Matchbox Cars and Lego figures.

Results

All four children demonstrated competency with the 51 concepts taught with the Kit by the end of training. The number of lessons required to do this ranged from 7 to 9. They also demonstrated knowledge of 35 to 38 of the concepts assessed during the probes. No child demon-

strated knowledge in more than 6 of these concepts during the initial probe. Thus, a real increase in knowledge occurred over a relatively short period of time.

Conclusion

The results of this study demonstrated the efficacy of the Buddy Road Kit for teaching environmental concepts. The concepts taught were successfully demonstrated in actual environments in most cases. Only the most advanced of concepts were not demonstrated by two of the children. It is important to note that all instruction was done in the classroom and limited to the use of the Kit. No supporting work was done in the actual environment. This was done to ensure that the generalization of concepts from the Kit to the actual environment observed in the probe was not due to other interventions. Yet, best practice would suggest that the use of both the Buddy Road Kit and lessons in the actual environment would be more efficient that the use of the Kit alone. We would certainly suggest it be used in that way and only limited its use in the way we did for the purposes of this study.

The Kit, however, has a number of advantages over teaching these concepts in the environment alone. It allows those with considerable vision loss to explore road layouts and demonstrate traffic flows and routes tactually, something impossible in the actual environment. Low vision children may due this visually more efficiently than possible in larger scale environments. The Kit can be used within a school or home environment and can be used to build a whole range of different layouts, some of which may not be available in the local vicinity. The Kit is designed to be very portable coming in a convenient tool box and so is easy to transport. It allows the children to explore traffic conditions and environmental layouts in a safe and convenient way. The Kit is very similar to toys on the market and is seen as a fun thing to work with. During this study, the children had fun working with the kids and expressed their pleasure with it.

The main advantage of the Kit over other models is that it can be manipulated by the children and therefore used to build environments and environmental features as well as demonstrate them. The child's understanding may be assessed by observing them construct environments as well. Routes may be planned and demonstrated on the kit using Lego or other figures. The Children may move these figures around showing the teacher the streets they expect to walk along, the sides of the street they expect to be on, where they expect to cross streets, the type of intersections they expect to encounter and where they expect to find their destination.

The complexity of the environments may expand as the child's understanding expands. It is possible to start with simple street and block configurations and move to design more complex environments. Specific environments may be modeled as well. Kits may be added together to allow the child greater possibilities for constructing environments and work is currently being carried out to develop add-on kits. These will feature special layouts such as rural environments or airports etc., that are not possible to build from the standard kit. The Kit also allows for a smoother transition to the use and training in two dimensional representation in the form of tactile maps.

It is hoped that this Kit may become a well used and well loved resource for both O & M Instructors and Children with a visual impairment alike.

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TRAINING O&M SPECIALISTS FOR THE TWENTIETH CENTURY

DUNCAN MCGREGOR
The York Region District School Board
300 Harry Walker Parkway
Newmarket, Ontario L3Y 8E2
Canada

NORA GRIFFIN-SHIRLEY
Texas Tech University
College of Education
Box 41071
Lubbock, Texas 79409-1071
USA

The Eighteenth Annual Report to Congress on the Implementation of The Individuals with Disabilities Education Act (IDEA) for the school year 1994-95 reported that 24,877 students with visual impairments, and 1,331 students with deafblindness were being served in U.S. schools. However, according to the American Printing House for the Blind, over 45, 000 students with visual impairments were attending schools in the United States. This discrepancy in numbers indicates that a large number of students who are visually impaired are not receiving the service they require.

The training of teachers and orientation and mobility specialists to work with students with visual impairments lags far behind demand, and the need for service is particularly acute in rural areas, where the number of students is small, and the area covered is large. Currently in the United States, 12 universities have personnel preparation programs training dual certified professionals in O&M and education of children with visual disabilities. These programs, most of which require full-time commitment to study on campus, train professionals to function in both of these capacities in rural communities where it is often not feasible to hire two different types of professionals. More than three-quarters of the states have no dual certification programs (Ferrell, 1996).

In the spring of 1996, surveys were sent to the 1131 members of Division IX (Orientation and Mobility) of the Association for the Education and Rehabilitation of the Blind and Visually Impaired (AER). Only those members who were dual certified as teachers of students with visual impairments and orientation and mobility specialists were to complete the survey. The purpose of the survey was to determine where professionals with dual certification work; what their job duties and responsibilities are, their satisfaction with their preservice training and with their current job, and the future needs of their current workplace. Twenty-two percent of the

surveys, a total of 247, were returned. Thirty-five of these surveys were not included in the data analysis, because the respondents were not dual certified.

The complete results of the survey have been reported by Griffin-Shirley, McGregor and Jacobson (1998). The typical respondent was middle-aged, and held a master's degree, AER certification as an orientation and mobility specialist, and certification or endorsement as a teacher of students with visual disabilities. The majority of respondents were Caucasian (96%), while the remainder were Hispanic, African American, or Asian American. The largest portion of their time (48%) was spent engaging in the job duties of a teacher of children who are visually impaired, while 35% of their working hours were spent teaching O&M. On the average, respondents spent 17% of their time travelling to serve their students.

Respondents reported that they had an average of 18 children with visual impairments on their current caseloads, or in their classrooms. Typically, over the previous six months, the respondents had served 4 children who were totally blind, 10 children with low vision, 8 children with multiple disabilities other than deafblindness, and 1 child with deafblindness. Additional disabilities of students included cerebral palsy, developmental disabilities, learning disabilities, and traumatic brain injury. Concerning future trends within their workplaces, many respondents stated that there would be a need for dual certified professionals within the next 2 to 3 years.

Primary areas of concern include recruitment of minority students by university personnel preparation programs, caseload composition, and the continued need for certified personnel in the workplace. As universities are faced with increasing financial constraints, and as many teachers live in states without university programs, distance education programs need to be offered in addition to traditional on-campus programs. Professional organizations, such as AER, must change university standards and certification criteria to encompass distance education. Future professional development programs should place more emphasis on working with students with multiple disabilities, students with low vision, infants, and minority children. The vast majority of respondents worked in settings other than schools for the blind, so programs, and student teaching placements, should stress the intricacies of itinerant teaching.

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WHEN TRADITIONAL O&M STRATEGIES DON'T WORK: EVALUATING AND DESIGNING PROGRAMS FOR CHILDREN AND ADULTS WITH MULTIPLE CHALLENGES

WALTER DUCRET, CHERYL STEWART, AND JUDITH VANNAERSSEN
Overbrook School for the Blind
6333 Malvern Avenue, Philadelphia, PA 19151

Have these things ever happened to you in your mobility lessons? Joe Smith is listed on your caseload and you arrive for your lesson with the prerequisite long white cane with the fancy ball on the end and Joe drops it, throws it, licks it, hits himself or you...becomes a golfer, a baseball player, a Ninja!

What's your reaction? I quit...refer him to another instructor...curse out the supervisor because this person surely is not ready for mobility...refer him to the school psychologist...battle with him to use the cane or...consider this option:

Consult a checklist that allows you to review all the skills that are necessary for cane use. Then begin to address the missing elements that will make cane use possible.

The field of mobility has begun to deliver services to a wide variety of children and adults in recent years. Many of these clients are unable to use a traditional long cane and its traditional teaching strategies. The advent of the pre-cane was a good start in meeting the needs of special clients. There are a large variety of pre-canes in the literature and many articles suggesting cane substitutes. How do you determine which type of device will meet the needs of the students or clients you are working with? We're here to propose a systematic, comprehensive approach to guide the selection of a mobility device.

We believe it is essential to determine the needs of the individual, physically, cognitively, and emotionally. If these needs of an individual are not met, cane use will not be successful or ideal. In our experience, we've found that many children and adults are missing many components of control necessary to utilize the long cane. We recommend addressing all areas of development in order to select the initial device and plan for changes in successive mobility devices. Ideally, this is a job for a team including occupational and physical therapists, family, teacher, and student, along with the mobility instructor.

The basic skills of an individual, in relation to mobility instruction, may appear to be simple and obvious: He or she needs to be ambulatory, able to grasp an object, have a basic understanding of body concepts...and off he goes! We believe the challenge is much larger and requires we recognize the underlying physical and emotional needs of each individual to function and learn. We suggest the following areas are critical to the development of good mobility skills:

- ✓ Awareness of body
- ✓ Proximal control
- ✓ Bilateral integration
- ✓ Balance and rotation
- ✓ Upper extremity control
- ✓ Spatial orientation
- ✓ Level of alertness

Today in our session we will look at a checklist that we find useful in determining the types of devices to use with a client. First, we'll read over the basic mechanical and social needs that must be present. There are descriptions that will jog your memory of a certain student. "That sounds like Susie" or "John does that!" After the overview, we'll look at device selection based on this frame of reference.

Basic Mechanical Needs	Red Flags
Sensory Processing...ability to integrate all five basic senses plus the neurological processing of motion and deep pressure to joints and muscles.	Over/under responsive, tactually defensive, easily startled or distracted, stiff to floppy muscle, won't walk on different textures/surfaces
Body Awareness...awareness and understanding of ones own physical identity. Ability to differentiate the body from its surroundings...ability to separate and move the body in pieces rather than as a whole.	Fearful, unable to organize movement, goes in circles, no sense of direction, lost in space, difficulty following directions
Level of Alertness...ability to receive input from the environment.	Over/under responsive, difficulty identifying and interpreting environmental cues
Proximal Control...ability to control the trunk in a variety of positions and movements including: prone, sitting, all fours, standing, walking, running.	Rag doll appearance, poor posture, rounded posture (slumped), difficulty in making transitional movements, difficulty on uneven surfaces
Bilateral Integration...ability to demonstrate coordinated use of both sides of the body.	Ignores one side of body, can't steer or push a device, poor coordination for 2-handed or footed activity, difficulty on stairs, fencer's pose, side to side waddle, clumsy, and goes in circles
Balance and Rotation...ability to centrally control while moving in a variety of directions and patterns and in response to gravity and surface changes.	Falls down, stiff walker, fixed positions, won't hold cane, a "Frankenstein" walk, won't walk on grass, sand, inclines
Upper Extremity Control...ability to demonstrate increasingly differentiated, purposeful, and refined movements of the upper back, shoulders, arms, wrists, and fingers.	Can't place cane, flinging canes, floppy arms, unstable wrists, poor grip, always dropping cane

In order to deliver high quality services and know what people are physically capable of, we believe you must also recognize and attend to individual personal and emotional issues, including:

1. **Method of communication** - Children communicate in a variety of ways in addition to or in place of verbal methods. Formal methods are sign language, object systems, computerized augmentative boards; and informal methods include gestures, body postures, and facial expressions. Behavior is a key way to get messages.
2. **Reason to move** - Students will not be motivated to move if there is no reason for them to move, or they feel unsafe.
3. **Independent movement** - Each child has some type of movement he can do independently. It may be rolling, crawling, scooting, etc.

EVALUATING & DESIGNING MOBILITY DEVICES CHECKLIST		
Student Name:	Evaluator's Name:	Date:
	Abilities	Problems
Sensory Processing		
Body Awareness		
Level of Alertness		
Proximal Control		
Bilateral Integration		
Balance and Rotation		
Upper Extremity Control		
1. Method of Communication		
2. What motivates movement		
3. Method of independent movement		
Summary:		
Recommended Mobility Device		

The E&D Checklist is a useful tool for O&M professionals working with individuals with multiple challenges. It provides a method for identification of underlying problems/issues that interfere with traditional cane skills. The E&D is a valuable tool for guiding comprehensive evaluation and design/selection of mobility devices. This checklist can also serve as a vehicle for opening or strengthening communications between O&M specialists and other disciplines such as the educator, occupational therapists, physical therapists, speech therapists, physicians, and family.

SIGHTED PUBLIC REACTION TO BLINDFOLDED STUDENTS

JADWIGA KUCZYÑSKA-KWAPISZ
The Maria Grzegorzewska College for Special Education
Szczêœliwicka 40, 02-353 Warsaw, Poland

In recent years considerable political, economic and social changes have taken place in Poland. Along with the global transformation taking place, the situation of blind people in our country has been changing too; a new approach to the system of their upbringing, training, educating, and employing can be observed.

Under the socialist system, i.e. before 1989, the dominant policy towards the blind was that they should be placed in special residential centres in which they would be provided with appropriate social care, education and places of work.

Such were the tendencies. Fortunately, they are no longer valid, and belong to the past, mostly owing to the active involvement of the blind themselves. The dominant trend in Poland nowadays is ***integration***. The majority of blind children attend regular schools, more and more adults work outside the community of the blind, more and more educated and qualified people, for instance lawyers, interpreters, or masseurs, set up their successful businesses. For this reason, i.e., professional self-reliance, blind people wish to be more and more independent also in the area of orientation and mobility (O&M). This is not to say that in the past blind people did not work on their own and that they were not trained in the area of orientation and mobility. After the Second World War, Special Rehabilitation Centres for blind soldiers were created in which the members of the centres were provided with O&M training. The instructors were recruited from among rehabilitated blind people. O&M training took place on the premises of the rehabilitation centres and in their neighbouring areas. The situation changed in 1979, when Stanley Suterko came to visit Poland and organized a course for O&M instructors. Since that time on, the Maria Grzegorzewska College of Special Education in Warsaw has been running specialist courses for O&M instructors.

On behalf of myself and all my colleagues from Poland and Lithuania, both seeing and blind, I would like to express our gratitude and thanks to Stanley. His considerable expertise and kindness still bring fruit and the output is tremendous.

Training O&M specialists in our institution is accompanied by doing research. On the basis of the research carried out by us in 1993, we found out that few people are in personal contact with the blind, 23% of people have never had anything to do with a blind person. Sighted people tend to think and feel about the blind in terms of their subjectively created images referring to the blind. Those images are often false. They are built on prejudice and stereotype thinking, and are often stimulated by a seeing person imagining himself or herself being without sight. All those images are inadequate depictions of the real situation of the blind. In most cases, the seeing fail to realize what the real abilities and limitations of the blind are.

The main objective of our recently carried out research was the observation and analysis of various patterns of behaviour and reactions of the seeing toward the blind as the latter were moving around on their own in anonymous situations. We observed the reactions of the sighted towards a casually met blind person who the sighted did not know and who had not been previously contacted by them.

I carried out the above mentioned research with a group of twenty (20) seeing students, aged 20-23, who were specializing in O&M. They took turns assuming the roles of observer and blind person. While playing the role of the blind, the students had their eyes covered with dark glasses and they were using white canes. Playing the role of the blind, the students did not stimulate any reactions on the part of the seeing, by asking questions or requesting help.

The research was carried out in the centre of Warsaw. We were observing the spontaneous reactions of seeing people towards the blind in the following situations:

— a blind person crossing the street.
— a blind person waiting for a bus or tram at the bus/tram stop
— a blind person walking along the sidewalk
— a blind person getting on a bus or tram
— a blind person travelling by bus or tram

Each student taking part in the experiment participated three (3) times in each of the above situations. Thus, altogether we obtained sixty (60) observations for **each** of the five situations listed above.

A student playing the role of a blind person was moving along a specified route. He was, at some distance, followed by a fellow-observer who was trying to register various models of behaviour as well as the comments uttered by seeing people who were passing by. When the observation was over, each particular situation was discussed with the participant who had played the role of a blind person, and conclusions were formulated. The conclusions, in their final version, were then put down in the observation sheets.

Crossing the street is generally found to be so difficult and dangerous for a blind person that passers-by feel strongly obliged to warn him/her against the inevitable danger. With reference to the above, our experiment revealed the following: 48 % of passers-by got hold of a blind person's arm and spontaneously led him/her to the other side of the street; 18% clearly and distinctly informed a blind person that crossing the street was allowed at a given moment; 22% communicated indistinctly that the crossing was allowed, and the people who had their eyes covered were confused, i.e., they did not know what was going on. Only 6 % of sighted passers-by asked if they could be of help, and waited for a reply. Very few "blind people" were able to cross the street on their own, unaided by the seeing.

The examples quoted above reveal both an overprotective disposition and a tendency to treat the blind as physical objects.

In the situation of waiting for a bus or tram at a bus or tram stop about 50% of passers-by wanted to know the number of the bus or tram which the blind wished to take. Every fourth person inquired about the destination of the intended journey, and every fifth person spontaneously informed the blind person about the number of the approaching bus or tram. In a few situations, sighted people remained silent. The most frequently asked questions were the following: "What happened?" and "Why can't you see?" Some people were loudly expressing their feeling of sorrow and compassion; some of them slipped some money into the blind person's pocket.

In the situation when a blind person was walking along the sidewalk, the dominant pattern of behaviour, on the part of the seeing, was catching that person by the hand and asking about his or her destination. Also, a spontaneously declared readiness to assist the blind person was observed. Another frequently repeated model of behaviour consisted in informing the blind person about some obstacles in his or her way. However, in most cases, the message about the obstacles was not clear enough, or sometimes it was even misleading. It consisted of the repeated command: "on the left" while in reality the desired direction was "on the right"; sometimes a laconic statement "the cars have stopped" was uttered. The third most frequently observed behaviour of the sighted involved moving a blind person from one place to another in order to prevent him or her from hitting an obstacle in his or her way. This was done without saying a word. On several occasions, the obstacle served as a useful point of orientation for a blind person. All of the above described patterns of behaviour also reflect and confirm the already identified tendency to treat the blind as physical objects.

In the situation of getting into a bus or a tram, the majority of the sighted offered support to a blind person, which occurred spontaneously and in silence. The above described behaviour manifested itself in the following way: the blind person was caught by or under the arm, pulled inside or pushed slightly in the right direction; sometimes the seeing person got hold of a blind co-passenger and turned him or her in the right direction. One third (1/3) of the investigated cases revealed the following: the seeing caught a blind person by the hand and immediately informed him or her about where the blind person was, or the seeing verbally communicated the message about their intention to help the blind person get into the bus. The underlying explanation of the above pattern may be lack of knowledge on the part of the sighted, and their being convinced about the complete helplessness of a blind person.

While on the bus or tram, the most frequent reaction on the part of the seeing was giving up a seat to a blind person. This did not occur only when a blind passenger had not been noticed. In such a case, those who had noticed would shout: "give up your seat to the blind, please, one should have mercy!" or "a person with a white cane on the bus, give up your seat!" The blind who refused to take the seat given up to her/him was vehemently persuaded to do so, even when he or she clearly declared the intention to get off on the next stop. Another pattern of behaviour registered while on the bus or tram was the spontaneous leading of a blind person to an unoccupied seat; this included various forms of manoeuvring such as removing pushing or turning. A case was observed when a sighted person was pushing a blind person down to make that person take an unoccupied seat. Sometimes, intending to point to an unoccupied seat, people used gestures which were incomprehensible for a blind person. On con-

siderably rare occasions, a blind person received a correct and comprehensible message followed by an offer, on the part of the sighted, to help that person reach the unoccupied seat.

To sum up, apart from watching passively, the most frequently observed form of reaction was an intention to help. In most cases, however, the intended help was provided in an incorrect way. Often, instead of facilitating the blind person's performance, it introduced confusion or even misled that person. On numerous occasions, treating the blind as physical objects was clearly observed.

After finishing our experiment, we decided to popularize our findings through the media, such as the press, radio, and TV. The Polish Association of the Blind has organized a competition to win a "Golden Braille Cell," in which the participants contend for a special award. I am the chairman of the jury. On the day of L. Braille's birthday, a special statuette with a golden Braille cell is awarded to creative authors in three different categories. The categories in question are a television programme, a radio programme, or a newspaper article, in which the hero of the story is a blind person.

ACCESSIBILITY, A PRIORITY OBJECTIVE FOR THE XXI CENTURY

ROSARIO RODRÍGUEZ DE LUENGO
O.N.C.E. O&M INSTRUCTOR
Gran Vía Ramón y Cajal, 13. 46007 Valencia, Spain.

INTRODUCTION.

The high level of social and occupational integration of blind or visually impaired people in our country increases their need for autonomy in their daily travel.

The success of independent, efficient and safe O&M is a priority objective, closely related to Accessibility (hereafter, A.) of surroundings.

Although there is a growing interest among professionals associated with this field, and attitudes have changed substantially - evolving from solidarity to the encouragement of social awareness and consideration of A. as a basic and irrefutable right - the shortcomings of the present approach call for an urgent revision of the basic principles on which it is based.

In the context of the CIM, constant progress is being made in the development and perfecting of rehabilitation processes, technical aids and appliances. But, having reached this point, we must target our efforts at reaching a similar degree of improvement with respect to the accessibility of surroundings.

Our main thesis is: "The future of A. depends less on equipping individuals with tools to confront the existing barriers than on making surroundings accessible to everyone."

We shall analyse the insufficiencies of the current approaches and possible solutions, which will focus on four basic principles of action that have a substantial impact on O&M.

1.- ACCESSIBILITY AS A RIGHT OF UNIVERSAL INTEREST.

The concept of A. - understood to mean solidarity with people who are afflicted by some sort of handicap - is too narrow, since we are all, indeed, affected by it.

The point of departure should be a comprehensive social model reflecting the needs of each and every group: the elderly, children, people suffering the consequences of an accident or convalescing, or pregnant; people who are overweight, very short or very tall, carrying children or pushing a baby carriage; people in wheel chairs, on crutches or carrying a cane, carrying packages or heavy luggage, pulling shopping carts, etc. It may be, then, that the outcome of sectoral action intended to solve specific needs paradoxically is the creation of new barriers,

not only for other communities with different kinds of handicaps - as indicated above - but for society at large.

A. therefore, in accordance with the above thesis, must be an indicator of the quality of life, a right of universal interest, making all domains “apt for all”.

2.- FROM SECTORAL MODIFICATIONS TO POLYVALENT ACTION

We must forego action as taken at present, based on designs for specific modifications, drawn from the analysis of specific needs posed by specific handicaps. This dynamic is mistaken because it establishes parameters based on each need individually. The result is a series of mis-matched and mutually exclusive undertakings which often create new barriers for people afflicted by limitations other than those analysed.

This limitation is reflected in the literature in expressions such as “(...) dimensional dispersion and a unidirectional approach towards handicaps involving walking call for reflection to clarify the present confusing scenario” that reveal “(...) the difficulty in determining valid parameters, due to the heterogeneity of the limitations”.

Such assertions may legitimise or justify the determination of the parameters in question, attending essentially to the limitations entailed in certain handicaps.

New revisions and editions of publications in which an attempt is made to address other needs - previously ignored - tend to merely incorporate or add new measures without attempting a consensus and, even more critically, fail to verify their impact on the situation taken as a whole.

Even today we can find unfortunate urban planning programmes based on the obsolete notion of “accessible routes” (one wonders whether reserved or merely intended to limit mobility and restrict autonomy to the itineraries imposed). In such cases, the esteem in which the concept “social integration” is held is definitely in need of review.

Scattered legislation containing substantial inconsistencies and leniently enforced is not exactly the best way to overcome sectoral approaches.

All the above leads us to support a polyvalent approach to action at all levels.

3.- MULTIDISCIPLINARY APPROACH.

Sections 1 and 2 come down specifically to two priority objectives:

a) Detailed detection and analysis of each and every one of the needs.
b) Research on polyvalent designs and the achievement of parameter compatibility.

Such objectives are unfeasible without a multidisciplinary approach. They can only be reached by creating teams of specialists in the various fields, composed of experts in: rehabilitation, special education, geriatrics, orthopaedics, traumatology, ergonomics, architecture, urban planning, industrial design, etc.

These **multidisciplinary teams** would ensure prior consensus for subsequent action (objectives a and b) and would, likewise, assume the following functions:

- Co-operation and counsel for both institutions and individuals with regard to training, dissemination, publications, etc.

- Establishment of guidelines to serve as a basis for:
    - Proper formulation of regulations and publications.
    - Supervision and approval of projects and developments.
    - Standardisation of solutions, criteria and guidelines.
    - National and international co-ordination.

4.- IMPACT ON TRAINING, DESIGN AND EXECUTION.

The demands set out in the preceding section have important consequences on the following areas of action:

Training: It is up to the Government (Ministry of Culture) to replace the present voluntary and generally brief seminars or monographic courses by incorporating this discipline in the respective curricula, to the extent required in each of the professions involved, i.e., those listed in the preceding point plus Social Work and Social Education. Such training must also be included in instruction courses for Local Police Forces (community or district police), whose functions include guaranteeing due compliance with the relevant regulations.

Design: The professionals responsible for designing and planning our communities lack the proper A. training. This shortcoming can be remedied via formal education, as well as through the publication of reference manuals and other coherent publications.

Moreover, systematic supervision of project design should be established in order to correct any A. restrictions before execution.

Development or Execution: Often execution does not match design, so works must be monitored through to total completion. Thus, inauguration should be made subject to passing A. inspection, much the same as is done with respect to Safety Standards on fire protection.

5.- STANDARDISATION.

It is obvious that, once the objectives proposed as priorities are achieved with the human resources proposed, we will be on the way to reaching the ambitious goal of Standardisation.

It would be unthinkable for highways that bear automobile traffic to be cluttered with unexpected obstacles, impassable barriers, ditches, etc. and subject to no enforcement of traffic regulations, i.e., no fines; and it would be equally unthinkable for the traffic code to change from one district, one region or one country to the next, or for traffic signs to be incomprehensible for "outsiders". This, however, which is so unthinkable on streets and highways, is just what occurs on our sidewalks: a blatant inconsistency?

For this reason it should not be utopian to be able to walk safely and confidently along the sidewalks in our communities. What is more, pedestrians' spaces must be made recognisable - standardised - regardless of their geographic location, if we are to demand universal validity for such spaces.

This is particularly important from the perspective of blindness or low vision, which has not been sufficiently considered in terms of A.

If our ultimate objective in O&M is individual independence, Standardisation of surroundings - with respect to design, location and visual (colour contrasts), auditory, tactile (texture) and/or mixed codes - would obviously facilitate:

1.- O&M learning and application processes.
2.- Re-location in new communities or cities.

CONCLUSIONS.

We propose four basic principles for A. action:

-Insist on polyvalent action in attending to the diversity of handicaps, as opposed to sectoral approaches to modifications.

-Place the interests of society as a whole - globality of interests - ahead of disperse action.

-Correct the lack of co-ordination or mere clustering of professionals and/or bodies and institutions, via a co-ordinated, multidisciplinary approach to professional training and project design and development.

-Adapt existing legislation to the criteria set out above, in pursuit of international Standardisation of regulations.

ALTERNATIVE METHODS OF MONITORING ORIENTATION AND MOBILITY SKILLS BY INDIVIDUALS WHO ARE BLIND OR VISUALLY IMPAIRED

CAROL LOVE, PH.D.
Assistant Professor
Division of Special Education
University of Northern Colorado
Greeley, CO 80639

TOM HWANG, ED.D.
Assistant Professor
332 Erickson Hall, Dept. of Counseling, Ed. Psy. and Sp.Ed.
College of Education, Michigan State University
East Lansing, MI 48824-1034

Background. The crucial outcome of orientation and mobility (O&M) instruction is that it provides persons who are blind and visually impaired with the skills to travel independently in a variety of environments. Significantly, the student becomes a safe, efficient, and effective traveler. One particular issue in the field of O&M instruction is the qualification of persons who are blind or visually impaired to be O&M instructors. Concerns regarding O&M instructors who are blind or visually impaired can be grouped into two major categories: (a) safety or risk factors (Blasch, 1996; Millar, 1996; Wiener, Bliven, Bush, Ligammari, & Newton, 1992; "VA Rules," 1996) and (b) teaching techniques and strategies (Blasch, 1996; Dodds, 1983).

Contrary to the view that O&M instructors need vision in order to teach, is the validation of the knowledge and experience of the instructor and the teaching paradigm used. Mettler (1987) and Nyman and Mettler (1993) emphasized that persons who are blind or visually impaired teach from a model that is a "blind paradigm." That is, persons who are blind or visually impaired have experienced independence and have functioned without vision or sight. This has implications for their validation as O&M instructors.

Another critical point made by Nyman and Mettler is that the criteria for evaluating effective mobility instruction should be what is crucial for the student to learn, not how the instructor is teaching. The question to be asked is "what is essential for my student to learn?" As long as the student is a traveler who is safe, efficient, effective, and independent, the instruction should be on judged to have been successful. The focus should be on safety and independence, not on the methodology that was used to achieve the desired outcome.

Personnel Certification The former AER Functional Abilities Checklist held the standard that O&M instructors demonstrate the following abilities in order to perform essential job duties or functions: (a) perform visual monitoring tasks from 6 to 375 feet, (b) perceive objects in 3 seconds within a 300 degree field, (c) discriminate and locate sounds, and (d) monitor a student

in a variety of environments under different environmental conditions (Wiener, Joffee, & La Grow, 1994). With the passage of the Americans with Disabilities Act (ADA, 1990), individuals with disabilities can no longer be excluded from participation in services, activities, or programs on the sole basis of their disability. Participation must be allowed, as long as the individual who has a disability can perform essential job functions with or without reasonable accommodations.

Purpose of the Study. In light of the ADA legislation, the purpose of this study was to examine modifications or adaptations used by persons who are blind or visually impaired while providing instruction in O&M. This study was conducted in two geographic locations, and evaluated using a qualitative methodology. A single mobility instructor, who had a visual impairment, volunteered to participate from each location. Each mobility instructor was videotaped for 10 sessions of 45 minutes each. Each session involved the mobility instructor providing instruction in O&M to a student and/or client in his/her regular teaching schedule. Using the O&M Monitoring Strategies Evaluation (Stewart, 1995) as a guideline, the mobility sessions were evaluated and described vis-à-vis the types of modifications or adaptations used by the instructor while providing mobility instruction. Mobility teaching sessions were videotaped with a variety of students and/or clients, in varied environments ranging from travelling in simple indoor routes to downtown business area street crossings at light-controlled intersections. Additionally, each instructor was interviewed regarding demographic and teaching information.

Study Site 1. Mobility instructor A is employed by a local rehabilitation agency in Colorado. He has 4 years experience as a mobility instructor. Mobility instructor A's visual condition was reported as diabetic retinopathy with no light perception. Mobility instructor A uses a long cane at all times, for personal travel and during instruction time.

Some specific monitoring strategies used by Mobility instructor A were different than those used by a mobility instructor with more vision. Mobility instructor A typically previews environments and routes prior to providing instruction to his students. At times, he employs a speaking dialog with the student while travelling in order to monitor student location relative to other objects in the environment or to determine distance from the instructor. Mobility instructor A verbally explains critical sensory landmarks and environmental clues while the student is travelling to enhance the student's awareness of and encourage the student to use pertinent landmarks and clues. While the student is anticipating a street crossing, Mobility instructor A holds his own cane in front of the student to detect incorrect street crossing initiations by the student. When appropriate, Mobility instructor A will pair up two students with similar skill level to work together. On this type of mobility lesson, Mobility instructor A functions as a monitor and intervenes only when necessary. This pairing of students encourages peer modeling of O&M skills. Both this instructor and his students use metal/rubber cane tips which provide sharp auditory feedback to facilitate ease of location by the instructor, as well as by the student. Mobility instructor A uses near, intermediate, and distant monitoring strategies dependent upon the skill level of a particular student.

Study Site 2. Mobility instructor B is employed by a local rehabilitation agency in Michigan. He has 17 years experience as a mobility instructor. Mobility instructor B's visual condition was reported as low vision caused by congenital cataract. Mobility instructor B uses a long cane for personal travel, during instruction, and for identification.

Mobility instructor B uses some specific monitoring strategies that are modifications or adaptations of regular O&M instruction techniques. Additionally, Mobility instructor B uses his limited vision to monitor his students' performance. At times, Mobility instructor B will use a monocular to monitor his student's performance so that he can maintain an appropriate distance from the student and to monitor traffic. Mobility instructor B previews environments and travel routes whenever possible, especially checking for curbs. In situations where Mobility instructor B is not familiar with the environment his student will be travelling, he maintains a closer proximity to his student and also walks in front of the student using his cane to preview the environment. Closer proximity is also maintained by Mobility instructor B in situations which may be dangerous for his student. While walking side by side with his student, Mobility instructor B swings his cane in a wider arc to cover both sides of himself and the student so that the whole path of the student and instructor are cleared. When appropriate, Mobility instructor B may pair up students of similar ability levels together to facilitate teaching. Mobility instructor B ensures that surrounding community workers are aware of his job functioning as a mobility instructor so that they may provide assistance if needed. Both Mobility instructor B and his students use a ball tip. This tip produces more sound feedback and makes it easier for the instructor to maintain the student's location and likewise, for the student to be aware of the instructor's presence.

Conclusion. From information collected during personal interviews, both mobility instructors shared similar comments regarding the advantages of being a mobility instructor who is blind or visually impaired. Both mentioned being a role model for students/clients. They also believe that students or clients are more accepting of using a cane if the mobility instructor also uses a cane. Additionally, students or clients place more value on information provided by the mobility instructor who is blind or visually impaired and feel what this instructor says is more relevant to the needs of their students/clients.

Above all else, both mobility instructors were observed using good skills and techniques expected of any other mobility instructor, such as: ensuring the safety of his/her student by positioning himself/herself between the student and danger; maintaining an appropriate monitoring distance from the student; and monitoring the student's location in the travel environment at all times. While the results of this study cannot be generalized to all O&M instructors who are blind or visually impaired, it provides some preliminary information on a topic that has been lacking in research. The authors feel that further longitudinal research using a qualitative methodology is needed on the topic of training O&M instructors who are blind or visually impaired. From the results obtained in this small study, the types of modifications or adaptations that may be used by a mobility instructor who is blind or visually impaired vary dependent on the individual characteristics of the instructor. It appears that a particular modification that works for one mobility instructor may not work for another. As a final note, the authors use the quote by Fazzi (1996), who expressed, "Just as possession of 20/20 vision does not

ensure that a particular individual will become a safe and effective O&M specialist, nor does blindness pose an insurmountable obstacle to all blind individuals who wish to pursue this career." (p. 5).

This study attempted to systematically document the creative techniques and strategies successfully employed by O&M instructors who are blind and visually impaired. These documented monitoring strategies can be used as a starting place for university O&M teacher preparation programs to better prepare O&M teacher candidates who are blind or visually impaired. These documented teaching adaptations and modifications also provided some positive answers for those who doubted the ability of persons who are blind or visually impaired to teach O&M skills.

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AN INDEPENDENT LIVING FOR AN ELDERLY DEAFBLIND WOMAN

BIRGIT BERGSTRÖM

Syncentralen, Lasarettet,
S- 251 87 Helsingborg, SWEDEN

Anna was borne deaf and later inflicted with blindness.

Ushers Syndrome is a term for combination of inborn hearing impairment or deafness together with a progressive defective vision, caused by
Retinitis Pigmentos (RP). The defect is first sluggish but with fast advancing degeneration of the retina`s sight cells.

She was borne in a family with parents, brothers and sisters with no diseases like Annas. In those days there were no education in sign language for parents. Anna learned lip- reading to understand her family. When Annas vision really began to deteriorate, everything has to go through her sister who signs well.

When she was eight years old she went to a boarding school for deaf children. In this school she was trained in sign language, on top of ordinary school matters. She stayed until she was fifteen years old.

Then she went to a domestic science school for two years.
And after that she went home and lived with her family.

At the age of thirty Anna lost her sight and moved to an institution for deaf-blinds. She was trained in Braille, cooking, baking, knitting and weaving.
Anna had to stay here for forty-eight years before she manage to get a home of her own. And now she was seventy-eight years old.

And because of Annas needs, the choice of home was important.
What Anna need, is possibility to get in touch with assisting personal
And we also help to educate them, in guiding manual alphabet and Braille and get information about technical aids.
She needed to get her home adjusted to suit her needs.
She has also had some help with labeling and organization of her lookers, drawings, stove, oven, microwave-oven, a s o.

Anna’s home is also equipment with technical aids:

Tele-tracer a door/telephone/fire alarm signals that is supplied with a sender, that gives signals to the vibrating receiver that she carries.

Tellatouch which is a Braille combined with a typewriter.

Anna`s **computer** is supplied with a Braille reader and Braille keyboard and a modem, thus allowing her to access informational data bases and to the computer conference system. With this modem connected to the computer is also used as a text telephone.
Anna can read the news pages from various TV channels, thanks to an interface card connected to her computer.

Orientation and Mobility is the process that makes Anna`s travel safely and independent, to use the remanding senses in establishing her position and relationship to other significant objects in the environment. To move from her home to a desired location in another part of the environment.

A deafblind in Sweden has a right to get support from society, transport service taxi, home help service personal assistance, interpreter service, technical aids, home adaptation, pension, disability allowance (compensation for higher living costs because of the disability).

Orientation and Mobility training, her technical aids and her new home has given Anna a new better life.

WHAT DO BLIND PEOPLE THINK ABOUT THE O&M IN THEIR LIVES?*

NANCY HIGGINS, PH.D CANDIDATE
University of Otago
New Zealand

This present study is part of a larger project which is about the experiences of 10 blind people in New Zealand mainstream schools; and how the meaning of blindness is socially constructed by education policy and practice. This paper, however, will explore the thoughts of the study participants about the Orientation and Mobility (O&M) profession and their memories about their O&M experiences. According to Oliver (1990) the rise of capitalism brought changes problems for social control. Institutions such as hospitals, asylums, workhouses, industrial schools and prisons sprang up as ideological mechanisms for control by separating out through medical and educational classification people who could or would not conform to the new order . Similarly, Tomlinson (1982) contended that the institution of special education is a product of vested interests, power struggles and the need of industrial society to train a stable docile workforce. Scott (1969) in his qualitative study*, The Making of Blind Men* concluded that professionals and organisations spoiled the identities and respectability of people with severe vision impairments in the service delivery process (Scott, 1969, p.24). Similarly, Monbeck (1973) and Mettler (1995) suggested that sighted individuals, and professionals, are convinced that what they accomplish is due to their sight, and that success is impossible without it.

The 1987 Special Education Review in New Zealand define students in special education systems as those who have "special teaching needs' (Department of Education, 1987, p.1) which are verified by professionals. However professionals may have different norms, culture, and expectations from those concerned (Barton, 1988;). .Stainback et al (1989) proposed that there should be no "special" system within Educational Systems and that integration can only occur in one system where all teachers are regular teachers and where all students are unique students. Fulcher (1989) found in her study of inclusion policy and practice in five countries that essentially professionalism and democratism in education have opposing discourses since professionalism maintained control as its objective through a language that is embedded in the 'individualistic gaze' of students with disabilities. Fulcher asked for: professionalism to be decoded by training regular teachers to be 'technically competent and by informing these teachers about the nature of politics and discourse.

O'Brien (1989) in her New Zealand study of the mainstreaming of children with vision impairments stressed that 'services should not be delivered at the expense of incurring further stigmatisation' (O'Brien, 1989, p.78). Ysseldyke & Algozzine (1995) suggested that in response to such challenges there has been an increased effort to reduce mainstream 'pull-out' programmes which have helped lead to stigmatisation or children with disabilities

(Sigelman & Singleton, 1986). Also, Oliver (1989) believed that disabled children are brought up to believe when they are taken from their classes for medical or para-medical intervention that they are ill or have a personal tragedy. (Oliver, 1989,, p.15)

Recently such social models of disability have been criticised for not recognising the individual lived experiences of disabled people and the limitations which are created by impairments of the body. Shakespeare (1996) stated that disabled people can create identities for themselves without being influenced by negative societal or biomedical intervention narratives. Crow(1996) stated that the silence about the limitations of the impairment in social models of disability have constrained her. Sally French (1993) cited her experience of vision impairment to argue that social solutions to her disability may not be possible. She stated that her social interactions with people with sight were uncomfortable because of her difficulty in reading non-verbal communication cues which affected the normality of her responses, and because of others' natural inclusion of subtle non-verbal communication clues. Some researchers have thus argued that special professionals are needed to address some of the difficulties which are caused by the impairment (Lowenfield, 1975; Hatlen & Curry, 1987; Bishop, 1986).

According to Galllagher (1988) specialists in the field need to prove that specialized services 'do the job they are supposed to".(Gallagher, 1988, p.228). Barton (1988), along with other researchers (Gerber,1990; Oliver, 1992) called for research to focus on understanding the world from the participant's viewpoint, to go beneath rhetoric in order to examine contradictions in specific social encounters, and to emphasize the 'social construction of reality and thus the ways in which people in their interactions reconstitute the social order' (Barton, 1988, p.90).

Method

Participants included six blind adults (3 females and 3 males), and four blind children (2 females and 2 males) and their mothers. A father of one of these children also participated in this study. Eight of the blind participants are of European descent, and two are Maori, the indigenous people of New Zealand. The age of the participants ranged between age six and fifty-four. Pseudonyms were chosen by the participants for themselves. These participants were able to provide this study with diverse information about the meaning of blindness in a variety of educational settings and in different historical contexts from the 1950s to the present. The educational settings included the special school at Parnell (later relocated and named Homai College), mainstream schools near the special school, non-local schools with an attached visual resource unit, and local schools with itinerant teacher support.

Using qualitative research strategies (Bogdan and Biklen, 1982; Donmoyer, 1990; Eisner, 1991; Patton, 1987; Reinharz, 1992), data was collected by the principal researcher in two to five open ended and semi-structured interviews. These lasted between one and half hours to three hours each and they took place where the participants felt comfortable. An interview guide approach to these interviews was used as suggested by Patton (1987).

A discussion group was formed, and made up of two blind people, including a representative from Ngati Kaapoo (blind families), and a parent of blind child. Their opinions and thoughts about the study formed part of the interpretation of the participants' experiences. This discussion group helped to prevent the creation of a 'top- down' project which is a study dominated by the researchers' concerns (Bishop, 1994). The data was inductively analyzed in their original transcribed form. Abstractions were built from particulars which were then coded and grouped together into the five themes which form the results of this study.

Results

Mobility is Definitely Important but not Necessarily Available: All of the participants in this study believed that Orientation and Mobility is essential to a blind child's growth and development. Joe stated that travelling with a white cane is not necessarily natural, and it is essential to have O&M at an early age. Anne was stated that O&M helped her gain control of her movements. Sue stated that if she had a blind child that she would certainly advocate for Orientation and Mobility instruction. All of the parents of mainstreamed children had difficulty obtaining Orientation and Mobility instruction for their child as it is not provided as part of the mainstream education system. Joanne comments about how a two year gap in mobility services has affected her son. Zwhaun spoke about receiving a sporadic service, and comments that her daughter has low muscle tone and has difficulty playing with other children. Jenny's son, Joe, has had O&M Instruction but only enough so that he is able to travel familiar routes. She stated that this is one reason why he needs to attend a residential vocational programme. Joanne also talked about moving the whole family so that her son could attend the special school to receive O&M. Davania attends the special school and her parents stated that they never have had to advocate for specialist instruction when Davania needed it.

O&M Professionals: The Good and the Bad: On the whole, this study found that most of the blind participants in this study had positive relationships with their Orientation and Mobility Instructors when their instructors were competent, challenged and motivated their students, and had a sense of humour. Anne's second O&M Instructor was a very important person in her life and was able to motivate her and help her become independent. Stuart praised his second O&M Instructor who was able to help him learn about his vision, and who challenged him to travel in difficult environments. William's admiration for his first instructor was linked to her unique personality: The parents in this study did not mention any negative experiences with O&M instructors. This study found that some O&M Instructors were viewed in a mediocre or a negative light when they were seen to be ineffective teachers; did not challenge or motivate their students, or were authoritarian in their approach to teaching. Sue was afraid of her O&M Instructor and found O&M to be quite a stressful experience. She spoke about a specific incident with her O&M Instructor when she was challenged too much and thought her instructor was unfair.

Stigma Is Not Necessarily Caused By Class Withdrawal But By the White Cane and Dependency: The participants in this study did not feel stigmatised when they were withdrawn from mainstream classrooms for specialist instruction. They believed that withdrawal was necessary for specialist instruction. Some of the participants felt there should be more

class withdrawal because it was linked with obtaining necessary specialist services, and others felt that their should be as little as possible withdrawal from the classroom. Others commented that it also was less stigmatising when they invited their classmates along, or if it was sensitively timetabled. They also commented on the fact that they did feel stigmatised by the white cane and by dependency when they were reliant on sighted help for mobility.

Orientation and Mobility and Disablement: Some of the participants in this study stated that they believed that they were controlled and disabled by Orientation and Mobility rules which restricted their movement, or by the lack of instruction which also limited their movement. For example, Stuart commented that in the special school O&M was used as a way to regiment blind people, because they only traveled in the sighted community during O&M lessons. Also, in the sighted community Hine found that she was not allowed to travel when she went home from the special school because they did not acknowledge her skills and abilities. Hine and Sue each talked about how they were prohibited from using their canes at various mainstream schools and how this restricted their independent movements All of the participants in this study also believed that if blind children do not receive O&M instruction their movements would be restricted.

Orientation and Mobility as a Professional Domain: This study found that there were mixed feelings from the participants about whether or not Orientation and Mobility needs to be taught by an O&M Instructors. Two male participants felt they, their sighted partners, or parents could teach O&M and that a professional certificate was not needed. The other blind participants believed that O&M instruction should come from a professional, with reinforcement coming from para-professional support, the family, and role modeling. Stuart also felt that it was important for the individual and parents to take responsibility for O&M especially in today's inclusive environment. However, all of the parents in this study believed that O&M instruction should come from professionals. Some parents believed that they could also assist in this instruction as well.

Conclusion

The social model of disability which states that professionals have created limitations and disabilities cannot fully explain the experiences of the people in this study. Instead, the results of this study support the arguments which call for models of disability to include the experienced limitations of the body's impairment, as well as the stories about social control and power. Hughes & Paterson (1997) believe that the social model, although it criticises professional intervention on the body, actually leaves the body in the hands of professionals by not acknowledging it. Allan (1996) similarly states that the writings of Foucault may be used to help describe the experiences of disabled children in mainstream schools. Maturana & Varela's (1992) constructivist tenant is that we share a common biological heritage which is the basis for the world. Through our senses and unique bodies, we are in continuous interaction with the environment, including the social environment, which leads us to move our behaviour in order to adapt and conserve ourselves. Environmental interaction and, also, explanatory discourses in conversation are used to trigger and compel others to change their behaviours and to fit the environment, and social systems. Viewing disability from

Maturana's perspective reaffirms the experience of the body, and of the individual. It also takes into account the environmental and societal barriers which disable people.

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MOBILITY IN THE SNOW

JENS DIETRICHSON, ROLF LUND,
CHRISTINE MOE AND EDVART SÆTER

Traveling independently without vision requires hours of instruction, learning cane skills, memorizing important routes, interpreting what kind of sensory information is available. It also involves hours of independent practice, honing newly learned skills, continually updating information, becoming a self-reliant traveler. However, sooner or later, the visually impaired traveler will meet unusual or unexpected situations that challenge his problem-solving abilities. Situations like this occur frequently when visually impaired people travel under adverse weather conditions.

Introduction

Norway is a winter country. In the northernmost parts of Norway, spring, summer and fall may last only 4 months, with winter claiming the remaining 8 months. Farther south in Norway, winter may be less severe, but winter conditions often last from the beginning of November to the end of March. Cold weather, falling snow, howling winds and ice underfoot all rally together to create difficulties for visually impaired travelers. Snow fall can change the physical environment to such a degree that the visually impaired traveler loses pertinent cues and has difficulties in orientation. Icy cold, gusting winds can make such a racket and be so physically uncomfortable that much sensory information is lost. Most visually impaired people change their habits during the winter months in order to avoid weather problems - going out only if door-to-door transportation is available, or depending upon sighted guides. Others attempt to deal with the problems imposed by harsh weather conditions, and some of them are quite successful. How do the intrepid travelers cope with the variable weather conditions of winter, what solutions have they developed, what are the differences between those who brave the great outdoors and those who do not?

Asking questions such as these may lead us to important information about mobility in snow. In this project we interviewed and studied the strategies of visually impaired persons whom we knew to be successful snow travelers. We asked a lot of questions. We used video tapes as a tool to document observations. We compared answers we received. Our goal has been to generate a discussion between mobility professionals and visually impaired travelers, in the hope that sighted teachers can greatly benefit from the knowledge of experienced visually impaired travelers. We hope that such an approach will lead to our becoming better teachers: better at teaching traveling skills in winter weather, and better at finding the right solutions for our individual clients.

Mobility in snow conditions is of a great concern to many visually impaired people. In spite of this, we had trouble finding papers on the subject. The best presentation we have found is a report from «The National Conference on Travel in Adverse Weather» in Minnesota in February 1975. The purpose of this conference was to present, refine and develop what was

known about travel in adverse weather conditions. Richard Welsh and William Wiener (1975) subsequently wrote the report «Travel in Adverse Weather Conditions».

Specific problems in winter conditions

Independent travel without vision must, due to its very nature, be less flexible than sighted travel. The visually impaired traveler is far more dependent on a much narrower range of information than is the sighted traveler. If sounds and tactile cues are obliterated by snow and ice underfoot, if the very environment one travels in changes drastically from one day to the next, if the available information becomes confusing and misleading, then independent travel will become difficult, if not downright dangerous.

Sound

Snow, in particular new powder snow, absorbs sound. Areas which previously reflected sound, may in certain snow conditions reflect less sound, or even absorb all sound. At the same time, snow muffles the sound of ones own steps and the tapping of the cane, which under normal conditions are important sound cues in orientation.

Wind can make mobility more difficult, as it can overwhelm auditory cues, thus making such cues less distinct and dependable. Wind can also mask other environmental sounds, making them unpredictable. Walking any distance in strong, icy winds is, in addition, mentally taxing and physically fatiguing.

One respondent had developed a strategy which served her well: she would walk slowly until she heard a sighted person come along, going in her general direction, then quickly follow on that person's heels. This would usually take her past the truly difficult parts of her route, saving her time and effort while maintaining her independence.

Losing sound cues meant losing ones oriential bearings, and all of the respondents avoided wearing head gear for that reason - it cut off too much sound information. Most of them would only resort to wearing a hat or cap if the weather was so severe that their health was at risk. Clothing which produced noise of it's own - rain slickers, nylon shells, etc - were also avoided as much as possible.

Touch

Unpredictability is a major problem in winter weather conditions. Drastically changing conditions makes independent travel complicated and often confusing. Snow and ice may obliterate any and all ground cues, leaving a traveler who relies on tactile information literally without a bearing.

Most of our respondents felt icy ground conditions to be more a nuisance than a major problem. This might be due to the fact that it takes time to build up a layer of ice, usually by many people trodding the same path over a course of several days. This gives the visually impaired person time to adjust to gradually changing conditions, acquiring new tactile cues as old ones are covered by icy build-up. Ice was also something one could counter by taking basic precautions. Ice spikes, fastened onto the normal walking shoes/boots, usually gave enough grip

on icy ground to make the going safe enough. Also, having boots which fit snugly increases ones awareness of the ground, and keep the feet from sliding around inside the boots - all the better to avoid losing ones balance on slippery ground.

Snow, however, was viewed by all of the respondents with dismay. Snow can wipe out all tactile and auditory landmarks in a matter of hours, leaving the visually impaired traveler stranded in a world with few distinguishing characteristics. Some of the respondents - even the very good independent travelers - claimed that on days with heavy snowfall - particularly early in the morning before the snow was cleared - they would just as soon arrange for door-to-door transportation or a sighted guide, because dealing with new, uncleared snow was simply too exhausting to face.

Most respondents, however, would adapt their cane technique to the extent that the cane would sweep from side to side, the arc of the cane moving in the exact opposite direction of two-point touch technique: high at the sides, low in the middle. This helped them to avoid the tip of the cane snagging in the snow at every step. Interestingly, some of the respondents did not use a different cane tip during winter; they preferred to use the straight nylon tip they used the rest of the year - all the better to assess whatever information the cane picked up on.

Most respondents also avoided mittens and gloves, as this tends to cut down the amount of feedback from the cane. If absolutely necessary, thin woollen fingerless gloves were preferred to almost any alternative.

Method

This project was based upon the surmise that very good independent travelers have a lot to teach mobility professionals about travel in adverse conditions. Interviews were duly conducted with visually impaired travelers known to be intrepid travelers, despite weather conditions. Data from these interviews were subsequently compared with field observation of real travel in the respondents' daily routes, and discussed with the project participants.

The seven respondents who were invited to participate in this project, were known to be outstanding independent travelers, braving any weather or geographical conditions they might meet. All of the respondents are blind (one woman has a 2 degree central field of residual vision which is also unpredictable), and all use a long cane for independent travel, one has recently acquired a guide dog. They were between 30 and 54 years old at the time of the interview, and all are gainfully employed. Their employment status proved to be significant for several of the respondents - why else would one leave one's home on a cold winters day with mounds of new snow covering yesterdays sheet ice - unless one had a really good reason to?

Materials used in the project were an extensive interview lasting 2 hours or more, in addition one back-up telephone call about 1 month after the interview for any post-interview insights. We also used video tapes of the respondents during independent travel in winter conditions, and discussion groups. The discussion groups consisted of four project participants.

We videotaped the repondents' traveling a familiar route in summer conditions. We then videotaped the respondents' traveling the same familiar route during the winter. We compared the two videos and discussed what differences in performance we could observe - in the respondents orientation, veering, straightening and use of cane technique. We had hoped to find that these respondents used vastly different cane techniques during the winter and summer sessions - or at the very least show us clearly how they managed to travel with little auditory feedback and even fewer tactile cues. The video tapes, however, did not show a series of startling or innovative cane or orientation techniques used by a select few creative individuals. Rather, they showed visually impaired individuals who were able to shift their focus from one type of environmental cue to another, indicating a flexibility in using any available information and transforming it to meaningful bearings.

Results

We have found three precepts to be true:

- that it seems to be indisputable that visually impaired people who travel well under adverse conditions, are good travelers under normal conditions. This means that the best preparation for traveling in difficult weather conditions is good and thorough preparation for traveling in general.
- that it is easier to travel under adverse conditions when the area is familiar, as it enables a visually impaired person to make sense of alternative cues when the primary information is changed or masked by the weather.
- that traveling in winter conditions requires greater problem-solving abilities due to the unusual and/or unexpected situations which are bound to crop up.

Having said this, there are in fact conditions where snow can actually be an advantage to some travelers:

- In clearing snow away from footpaths and streets, the resultant mounds of snow may form a guideline which is otherwise vague or altogether lacking (specifically in areas without sidewalks).
- Mounds of snow may form a buffer around problematic objects in the environment - for instance fire hydrants, parking meters - thus allowing the visually impaired traveler to avoid these.
- During certain weather conditions - very cold days with little or no wind, auditory cues may be transmitted better and for longer distances.
- Wind may give more information if it comes from the same direction.

Such advantages occur mainly in areas where snow conditions are stable over a course of weeks or months, such as in central eastern Norway. There are however far more disadvantages and difficulties caused by snow and ice, and these are the problems we have attempted to examine in the project.
Winter conditions - snow, ice, strong winds - make the environment less distinguishable, and often unpredictable because conditions may change drastically from day to day. For the traveler who depends heavily on tactile and kinesthetic information, this makes the environment

very complicated and confusing. It is difficult to anticipate what situations one will meet, and on-the-spot problem solving becomes necessary.

Implications for mobility training

As mentioned previously, visually impaired people who travel well under adverse conditions, are good travelers under normal conditions. This means that the best preparation for traveling in difficult weather conditions is good and thorough preparation for traveling in general. All of the respondents in our survey agreed that learning the fundamentals of long cane travel took time, and that it is essential that each visually impaired person is given enough instruction to master the basics thoroughly. Without training in fundamentals, the client is unable to learn modifications.

It is easier to travel under adverse conditions when the area is familiar, as it enables a visually impaired person to make sense of alternative cues when the primary information is changed or masked by the weather. One survey respondent claimed she would rather brave her regular routes - regardless of slippery ice underfoot and mounds of uncleared snow - than attempt to try unknown areas, even if she was told that they were cleared of snow and she had been given a verbal description of the new route.

Traveling in winter conditions requires greater problem-solving abilities due to the unusual and/or unexpected situations which are bound to crop up. Several respondents mentioned the need to be flexible in using whatever cues are available, rather than expecting the usual cues. It is essential to improve a client's ability to interpret auditory information, as well as improving the abilities to cope with many types of ground cover (grass, pavement, gravel, wood paths, etc.).

The mobility professional's dilemma is to find the right opportunity for training under adverse conditions. If it is not possible to go out with clients in icy, snowy conditions, we have some alternative suggestions:

- Teach falling techniques, starting on soft ground covers in a gym.
- Teach cane techniques on different ground covers: when the ground is heavily covered in falling leaves, information from the ground becomes less distinguishable and the client must learn to «sweep» the cane, rather than use two-point touch technique.
- Assist clients to become less dependent on physical and tactile landmarks, and focus more on the line of direction, knowledge of street patterns, any alternative cues which give directional information.
- Have extra winter clothing and equipment such as gloves, mittens, headbands and spikes available for clients who are not prepared and do not want to go outdoors.
- Mobility professionals also need practice in traveling under adverse conditions.

Conclusion

The ability to be flexible is of utmost importance to the visually impaired traveler who wishes to remain independent despite adverse weather conditions. When the usual auditory cues are

whisked away by sub-zero winds, the flexible traveler will find other sounds which impart information - and use them. When the usual tactile cues are erased by snow and ice, the flexible traveler will be able to make some sense of the environment - and adapt their cane technique to suit the conditions. This type of flexibility requires a truly solid foundation of basic skills, and it develops slowly through experience. Providing our visually impaired clients with different skills for the different conditions they will face, is essential.

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THE DEVELOPMENT OF ORIENTATION & MOBILITY TRAINING IN CHINA

GRACE CHAN, JP
Hong Kong Society for the Blind
Hong Kong

I. Introduction

Statistics show that the visually impaired population in China is about nine million, five million low visioned and four million totally blind approximately. The majority of them are in rural villages and remote parts of the country. There are 28 schools for the blind as well as about 80 others which admit both the deaf and the blind, providing primary to junior secondary education. Until the late 80's, China has never provided any rehabilitation, Orientation & Mobility (O&M) training or similar professional training for the visually impaired.

As a result, visually impaired people's skill of using other senses and clues to find their ways was poor. They encountered many difficulties in going about in the streets learning by trial and error which often involved fallings and injuries in the course of learning. The lack of O&M training also had detrimental effects on their social life and employment opportunities. It was observed that the congenitally blind were more independent than the adventitious ones. The latter chose to stay at home as a means to stay away from any danger.

Due to lack of resources and knowledge, when they had to go out, they would generally use rattan, iron or other metal sticks painted in red and white to help find the way and discharge any aggressive dog which might approach.

At the end of the 80's, China Disabled Persons' Federation (CDPF) and an overseas organisation jointly organised two short O&M courses in Beijing and Nanjing with Tom Blair, the renowned O&M expert, as one of the trainers. In 1991, the Carter Centre of the U.S.A. and the North-eastern China Normal University jointly organised a five-month O&M training course for teachers of special schools which included schools for the blind, deaf and muted, mentally handicapped, etc. in Changchun. However, as foreign language was the medium of instruction, it was difficult for the trainees to comprehend effectively. Furthermore, some trainees were not enthusiastic about the training because they were generally not involved in serving the visually impaired. So systematic O&M training programme for the visually impaired was in vain despite the fact that some courses have been conducted.

II. The Planning of O&M Instructors' Training Programme in China

O&M training in Hong Kong began to develop in the 60's which materialised in the beginning of the 70's. Susan McGrath, a rehabilitation consultant of the American Foundation for the Blind, was invited to Hong Kong to design a systematic rehabilitation training programme for the Society. A number of trainee instructors were sent to receive professional instructors'

training at the National Mobility Training Centre, Birmingham, United Kingdom between the end of the 70's and early 80's.

At present, the two Senior O&M Instructors of the Society, who are among those trained in UK and have more than 20 years of training experiences are involved in organising Instructors' Training Programmes in China and the East Asian Region.

The fact that numerous visually impaired people in need of O&M training and the lack of such knowledge in China led the Society to plan for a systematic O&M instructors' training programme. In addition, language and geographical location are also factors for us to take up such a role.

III. The 1st O&M Instructors' Training Programme

In 1990, the Society reached an agreement with the CDPF to jointly organise the 1st Instructors' Training Programme at Beijing in 1991. The Society was responsible for the expenditure, syllabus and instructors. The CDPF was responsible for providing local instructors, recruiting trainees, managing and supervising the training. Since there were many differences in road design, traffic conditions as well as transport facilities between Hong Kong and other areas of the country, one of our Senior O&M instructors paid a visit to Beijing to have a thorough study on the conditions before the training took place. Meanwhile, the difficulties encountered by the visually impaired in O&M were also being considered in order to design a suitable syllabus for them.

Trainees of the following qualifications were recruited: Between 21 and 34 years of age, healthy, good vision and hearing, secondary education and a minimum of three years' working experiences in the visually impaired field.

Thirteen cadres and instructors from eleven provinces and cities stretching from the south to the north of the country were recommended to participate in the two-month 1st O&M Instructors' Training Programme. All of them were rehabilitation workers for the visually impaired. The Course was held in September 1991 at the Beijing Home for the Disabled. Two O&M instructors from the Society, one senior and another experienced one, were responsible for the training. The curriculum included the Sighted Guide Technique, lower & upper body protection skills, directional concept and sound localisation, etc.

After completing the preliminary stage, trainees learnt cane skills, including going up and down stairs, diagonal and Two-point Touch techniques. Then trainees had field practice in the bustling streets of Beijing. As a result, even members of the public had an opportunity to be educated about O&M for the blind.

As pavements there were usually laid with many objects, such as cars, bicycles, motorcycles, goods and refuse bins, etc., it made the training rather difficult. In order to keep away from the obstacles, trainees were often forced to walk off the pavements.

One of the most difficult parts of the course was crossing roads under heavy and chaotic traffic conditions. In addition to the many automobiles, there were also lots of bicycles and motorcycles travelling in a continuous flow. It was a great challenge for anyone to cross such roads.

Public transport was also a great challenge for the visually impaired. Trainees were required to have good hearing and swift in order to maneuvre in crowded buses and determine the locations of buses which would stop at different spots every time. For underground trains, trainees must be familiar with the station concourses. Since the prejudice against visually impaired were prevailing, the public was reluctant to give any assistance to them. Hence, they must be independent in order to use public transport. Fortunately, trainees finished the field practice smoothly.

In addition to the practicum, there were also other related subjects in the course given by well-known local doctors and professionals, such as the anatomy of eye and ear, related diseases and basic knowledge in psychology. Moreover, trainees were taught how to produce tactile maps as teaching aids. In order to broaden the vision of the trainees, different organisations for related services were visited, including the Beijing School for the Blind, Beijing Massage Hospital, Welfare Factory for the Blind and China Rehabilitation Research Centre, etc.

The Course was completed with encouraging result at the end of October 1991. The thirteen trainees returned to their posts and compiled syllabi appropriate for their own districts. The concept of O&M appeared to have begun penetrating into the cities and provinces. There was room for improvement, nevertheless it was a significant initial step for O&M training in China. The Society had also helped CDPF to produce a videotape on O&M techniques, copies of which were distributed to all provincial Disabled Persons' Federations for training purposes.

IV. Establishment of the 1st Rehabilitation Training Centre in China

The Society organised two more O&M Instructors' Training Programmes in July 1993 and September 1994. The third one, in particular, was a comprehensive two-month course which included techniques of daily living, communication skills, low vision assessment and training, in addition to O&M training. 53 teachers and instructors of schools and organisations for the blind from 28 provinces and cities were trained.

The success of the training courses organised by the Society inspired a pioneer educator in the country, Xu Bailun, to establish the first national Rehabilitation Training Centre for the Blind in Tai An, Shandong Province. The Society assisted the Tai An Municipal Education Commission to apply successfully for a grant of US$39,000 from the Asian Foundation for the Prevention of Blindness to build the main block of the Centre. We have also given professional advice on the interior design and trained four instructors of the Centre which had 24 training places - 12 each for male and female. The Centre was opened in March 1997, providing training in O&M, braille, techniques of daily living and communication skills.

V. Conclusion

The history of O&M training in China has been going for seven years or so and the demand is ever increasing. The training programmes conducted and sponsored by the Society in collaboration with the CDPF and the Education Bureau, have been successful. It is comforting and encouraging to see that a growing number of professionally trained instructors teach O&M in many provinces and cities today.

It is the Society's hope that the instructors would design and organise their own instructors' training courses after gaining practical experiences. The greater number of professional instructors there are, the greater number of visually impaired people would be benefited.

In view of the prevalent problems discussed above, the Society will make the best efforts possible to work, in an advisory role, with the CDPF, the State Education Commission or other relevant government departments to eradicate the following:

1. The traffic and road conditions so as to reduce the hazards for the visually impaired.

2. The social awareness and public understanding towards visually impaired people.

3. The standard of the O&M instructors.

We are confident that these will help improve the quality of visually impaired people's daily living. We welcome the participation of any interested international organisation in realising the goal.

Thank you very much.

PURPOSEFUL ORIENTATION AND MOBILITY INSTRUCTION FOR CHILDREN WHO ARE DEAF-BLIND AND/OR MULTIPLY DISABLED

SAM MORGAN AND NANCY CORNELIUS
California Deaf-Blind Services
604 Font Blvd.
San Francisco CA.
94132

Introduction

Children who are deaf-blind and/or multiply disabled can be difficult to teach as they do not readily benefit from traditional methods of Orientation and Mobility instruction. Mobility instructors frequently struggle with how to supply meaningful instruction for them. These children can however benefit from mobility instruction. It has been shown that children who are deaf-blind who have not learned the sensory and conceptual skills that are commonly considered prerequisites for mobility instruction can:

-Learn routes in a variety of environments.
-Can generalize skills to new routes
-Demonstrate incidental learning about landmarks, clues, and memory tasks.
(Goetz, L., Guess, D., Stremel-Campbell, K. Innovative Program Design for Individuals with Dual Sensory Impairments. 1987.)

This session will present methods and adaptations that can help in designing instruction leading to increased independence in a variety of settings. Strategies will include: Methods of communication that can assist in giving meaning to mobility in general and instruction specifically. Environmental adaptations that order and therefor help the child to build spatial understanding of the environment. Criteria for choosing functional routines to instruct in and why this helps a child to understand the meaning of what is being asked of them in a variety of contexts.

Communication

The use of appropriate individualized communication systems with children who are deaf-blind gives mobility instruction meaning. Children need to know where they are going and why. Children need to have a way to identify location, a variety of people they come into contact with, and the activity that they are or are going to be involved in.

Personal Identifier: A personal identifier is something that a person uses when starting an interaction with the child. It can be a feature of their body such as curly hair or something that they always wear such as a necklace. These are important because they give an added cue to the child about what is going to occur. Different people do specific activities with a child and have a unique way of interacting with them. By giving the child this information you help them to prepare for the upcoming activity.

Reference Point: A reference point allows a child to learn routes within a familiar environment because the routes stay constant thus limiting confusion. All routes that a child travels can start at this reference point. Calendars, which are frequently used, are a good reference point for routes, whether the routes are within a room to start with, or are expanded into a larger area such as a school building. As the child becomes competent at traveling routes from the reference point, the routes can be more natural by starting at different points, not always at the reference point.

Activity Identifier: Activity identifiers represent a specific activity the child is participating in and are most meaningful when they are part of a child's calendar system. These are usually pictures or objects. The child is presented with the object/picture before they are expected to go to the location where the activity is done.

Location Identifier: A location identifier identifies a destination such as an area within a room, or another room where the child may be going. An example of this is a table in a classroom where a child does a number of activities. Textures are useful in identifying locations where a number of activities occur. Objects are good for separate rooms such as a music room or physical therapy/motor room. The location identifier confirms location; it tells the child that they have reached the destination.

The sequence in which these communication strategies would be used is as follows: 1. Personal identifier (tells the child who you are). 2. Reference point (lets the child know where they are and what their starting point is). 3. Activity identifier (Tells the child what the upcoming activity is going to be). 4. Travel the route. 5. Location identifier (tells the child they have arrived at the right place).

Environmental Adaptation

Adapting the environment can assist children in learning to organize and ultimately orient themselves in their environments. Lacking most extrinsic motivators, children who are Deaf-Blind need to be taught to explore environments, to benefit from the learning opportunities in them. Adaptation of the environment can help to build comprehension of space and ultimately create an understanding of the purpose of movement, which can then be expanded into larger environments.

Self Awareness: A child's comprehension of their environment starts with awareness of physical self and then extends into movement and the immediate environment. Teaching this to a child that is deaf-blind requires an approach based on experience and tactile input. A child who is deaf-blind needs a full range of sensory experience to build awareness of self and also to develop an intact sensory system. Some strategies that can be used are as follows: Massage, brushing (as prescribed by an Occupational Therapist), and weights on different body parts to build kinesthetic awareness. A next step above this basic sensory awareness would be to use activities to teach awareness of the body in space. P.E. activities that are movement based such as obstacle courses, precane devices to teach about the body in relationship to objects in the environment, and activities of daily living that can teach about movement such as personal care and basic cleaning tasks.

Create spaces: Creating interactive spaces for children that are deaf-blind can teach them that they can effect their environment. Strategies such as the little room (Lilli Nielsen) can assist a child in developing the early components of spatial relationships such as self

awareness, object concept, and object permanence. (The Little Room is a small space that objects that are attached to creating a reactive environment). Other strategies to achieve this effect are using mobiles with objects that the child can feel, or defining a play space by using blankets and/or cushions.

Environmental Consistency: It is important for children that are deaf-blind that toys and other materials that they use have a consistent place. This is true for a number of reasons. To motivate a child to move they need to have a predictable environment where they know they will find something if they go to find it. This is in many ways an extension of the Little room idea. This can start with a child's play area where toys will be where they can find them and can extend to an older child's work area where things are consistently located.

Defining large spaces: Larger spaces such as classrooms can be broken down into smaller spaces thus making the room more manageable. Spaces should be defined by what is done there. Free time area, work area, crafts area, etc. These spaces can be defined by using shelves for walls carpets to change the floor surface, etc.

Instruction in Functional Routines

Functional instruction includes not only instruction in the community, it consists of time, place, and context. Children who are deaf-blind learn from concrete experience in real environments. Mobility can be made successful by instructing within the naturally occurring routines of the child. Criteria for choosing functional routines and strategies for instruction, in both home and school settings, will be discussed.

Regularity: In order for a child to learn a route the route should be one that is used on a regular basis. A route that a child travels on a daily basis such as to the cafeteria is better than one traveled on a weekly basis such as to the gymnasium.

Motivation: The route should be motivating to the child. A route to a desired activity is going to be more easily learned than one to an undesired activity.

Skill level: Consider the skills required by the route; are there stairs, doorways, etc.

Time: Instruction of the route should occur at the time that it normally would during the day. If you are teaching the child how to get to the cafeteria you want to do it at lunch time not first thing in the morning.

Place: The routes need to be taught in the real environment. Children who are deaf-blind can, but do have difficulty, generalizing skills.

Effective mobility instruction depends on comprehensive communication, understanding of the environment including ones self starting small and expanding, and giving instruction meaning by instructing within the naturally occurring routines of the child.

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QUANTITATIVE MEASUREMENT OF TACTILE CONTRAST BETWEEN DOT AND BAR TILES USED TO CONSTITUTE TACTILE PATHWAY FOR THE BLIND AND VISUALLY IMPAIRED INDEPENDENT TRAVELERS

HAJIME SAWAI, JINRO TAKATO, AND MASAKI TAUCHI
Department of Health Science and Welfare System,
Okayama Prefectural University, Souja, 719-1197 Japan

INTRODUCTION

Tactile pathways are now widely installed on many sidewalks and train platforms in Japan as a guiding system for both blind and visually impaired pedestrians walking alone. The tactile pathways are constituted by two kinds of tiles. The one is a bar tile that usually has three to five bar-shape protrusions arranged in parallel, and its role is to display the direction to walk to the users. The other tile is called a dot tile that has several small round shape protrusions. There is a variety in dot shape (dome or half dome), size (20mm to 35mm) number and arrangement (parallel or diagonal to walking direction). The role of dot tile is to elicit attention from the users by installing it on the corner of sidewalk, entrances of staircase, branching point on tactile pathway and so on. These two types of tiles constitute tactile pathway and it was detected by foot and/or cane by the users. One of the problems is that there is a variety in surface designing as described above. In particular, dot tile, size, shape, number and arrangement have been diversified. Consequently dichotomy of the tactile guiding information system has become ambiguous and the possibility to mislead users has been increased. To improve this situation in Japan, standardization of the tactile tile might be necessary but there has been little effort to evaluate the perception of tactile surface pattern. We, therefore, performed behavioral research to evaluate 'tactile contrast' of five widely used dot tiles by measuring their detectability against a single type of bar tile. The result indicated that some of the dot tiles are more difficult than the other tiles. We further found some properties and behavioral characteristics of pedestrians during walking on tactile pathway.

METHODS

Subjects and Equipment

Six visually intact adults from 20 to 47 years of age participated in the experiments as subjects. During the experiments the participants were blind-folded and ear-plugged to perform tactile discrimination task without visual and auditory cues. All subjects put on the same size of shoes (length 25.5 cm, width 8 cm) like sandals of which soles are made of chemical board, leather and rubber. They used three kinds of sandals, called shoes I, shoes II, shoes III as below, with 9 mm, 18 mm, 24 mm thickness of the sole at the end of the heel, respectively. Twenty one sheets of bar tiles (SM300-line F-1, Kotsu-Anzen-Shiken Center, Japan), and three sheets of dot tiles were placed on a straight line as a test course (overall length 7.2 m)

in a semi-anechoic and sound-proofed room (H2.7 x W8.0 x L6.2 m). Five types of dot tiles (Kotsu-Anzen-Shiken Center, Japan) shown in Table 1 were used. All of them are commonly installed in Japan.

Experimental Procedures

Subjects were asked to walk on the test course straight with touching their hand on guide-tables put in parallel with the course, and to stop as soon as possible when they could realize themselves to enter from bar tiles into the dot tiles. In order not to predict the distance between start point and dot tiles, one out of five start points (0.9, 1.6, 2.3, 3.0, 3.7 m distant from the bar-dot tile boundary, respectively) was chosen at random in every trail.

Recording and Analysis

All gaits on dot tiles were recorded with a video camera to analyze how the subjects stopped or passed. When a subject stopped on dot tiles, he or she was asked to introspect the following issue about detection: when was the detection made, which foot was used for the detection, and what is feeling of the detection. All trials were categorized into either correct or incorrect one on the basis whether they could stop on dot tiles or not. The percentage of correct trials for each subject and each type of dot tiles was calculated as detection rate.

RESULTS

Detection Rate

Each subject executed 180 trials of detection task under completely randomized fifteen conditions, i.e., five different dot tiles by three different thickness of sole of shoes. Average detection rates of the six subjects were statistically tested by two-way layout analysis of variance. Interaction between two factors is not statistically significant ($p<0.05$), but main effect of both factors was significant ($p<0.01$). Using multiple comparison by least significant difference, mean detection rate was compared among dot tiles (Fig. 1). It was statistically significant that mean detection rate of tile-e was lower than that of the other dot tiles. Mean detection rate of tile-b was also significantly lower than that of tile-a, -c, and -d ($p=0.01$). For thickness of sole, mean detection rate with shoes I (thinnest) was highest and lowest was shoes III ($p<0.05$, Fig. 2).

Property of Detection

To understand how subjects detected dot tiles, we analyzed their introspection that was obtained from 866 out of 1350 correct trials. These trials were classified into at least two major categories on the basis of detecting foot (fig. 3). In 753 trials (86.6%), subjects recognized tactile difference between bar and dot tiles on the rear foot of their last step. In 68.9% of those trials, subjects also identified the place of foot as an anterior portion. There found only 33 trials (4.5%) where they recognized distinction on the front foot of their last step.

DISCUSSION

We evaluated five dot tiles having three different sizes, two different shapes (dome or half-dome) and two different arrangement (parallel or diagonal). It was found that tactile contrast

between a single type of bar tile and each of dot tiles are not equivalently high, i.e., the two kind of dot tiles (type -c and -e) showed significantly lower detection rate. The result suggests that these two tiles are inadequate to install with the bar tile (most widely used in Japan) used in the present experiment. To find out the reasons why tactile contrast of each dot tiles are different may be very important for creating more effective tiles. To elucidate this, we are now analyzing touch pattern between foot and tactile protrusions, and pressure distribution on the foot.

Analyzing subjects' introspection, we found that the subjects almost always detected dot tiles by rear foot of their last step before stopping. It is also identified that the anterior part of the rear foot was responsible to detect tactile patterns. Our findings suggest important nature in discriminating tactile tiles during step on tactile pathways; tactile pattern can be recognized by pedestrians within the period of foot-flat and push-off of gait cycle. This indicates that pedestrians walking on tactile pathways tend to move one step forward even after they notice the presence of dot tiles.

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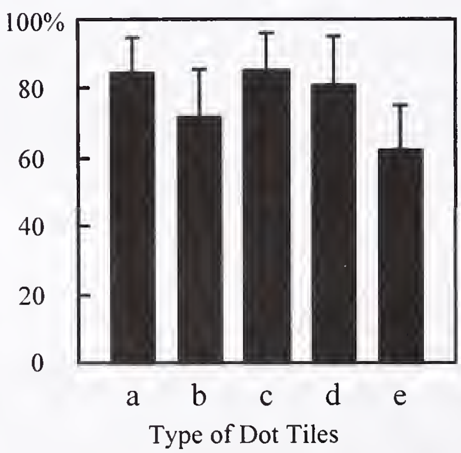

Fig.1 Mean detection rate of dot tiles. bar: SD (n=6)

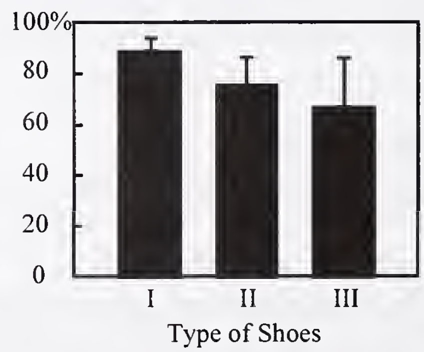

Fig.2 Mean detection rate with thre different shoes. bar: SD (n=6)

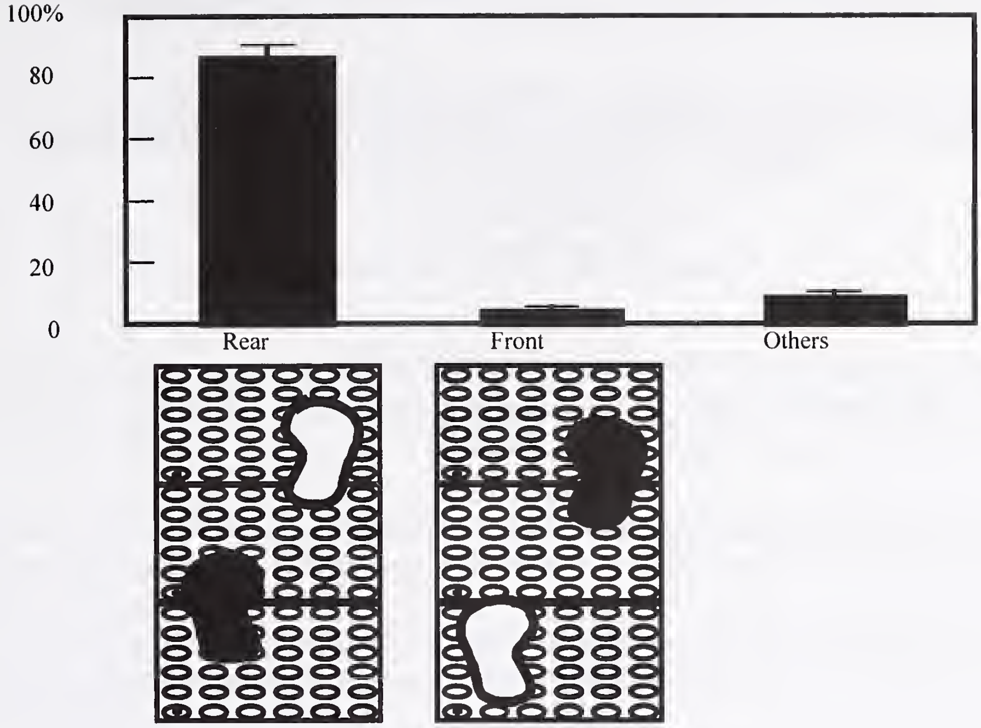

Fig.3 Relative frequency of three detection pattern at last step. bar: SD (n=6), Drawings below graph indicate a foot (shaded) used to detect tactile contrast at last step.

Table 1. Specification of Bar and Dot Tiles

Type	bar tile	tile-a	tile-b	tile-c	tile-d	tile-e
Design (top view)						
Protrusions *placement*		diagonal	parallel	diagonal	parallel	parallel
shape (top view)						
(side view)	harf doom	harf doom	doom	harf doom	doom	harf doom
size(mm)	275/285 x 23/25	20/29	24	12/23	34	24/34
height(mm)	5	5	5	5	5	5

COPING WITH STREET FURNITURE IN THE SOUTH AFRICAN URBAN ENVIRONMENT

MOIRA HIGGERTY
THE SOUTH AFRICAN GUIDE-DOGS ASSOCIATION FOR THE BLIND
P.O. BOX 67585
BRYANSTON, 2021
SOUTH AFRICA

Introduction:
An outline of what is meant by the term “street furniture”. Also included will be an historical perspective as to why there has been an increase in recent years of vendors and hawkers on the pavements in urban areas in South Africa.

Problems associated with the negotiation of street furniture
Problems encountered by the visually impaired guide dog owner or long cane user include such aspects as :

- -absence of navigable space on the pavement/sidewalk
- -dangers involved in using alternative methods of negotiation of street furniture
- -disorientation
- -attitude of vendors/hawkers to the disabled traveler
- -attitudes and experiences of the disabled

Problems are also encountered by other disability groups such as wheel chair users.

Skills and Techniques:
The need for the visually impaired traveler to :

- gather information which will enable him/her to make the correct decision of “which way round”.
- develop good orientation skills.
- good cane techniques both to navigate the obstructions and avoid danger to other pedestrians.

Present Legislation:
An overview of the present legislation governing the presence of vendors/hawkers on the pavements and the lack of a uniform policy in this respect.

Conclusion:
What is being done or needs to be done in the South African context to alleviate the situation for the visually impaired and other disability travelers?

Coping with Street Furniture in the South African Urban Environment

Saturday, July 4 morning

A CONVERSATION WITH RUSSELL WILLIAMS: THE EARLY YEARS AT HINES

RUSSELL C. WILLIAMS
AND
RICHARD L. WELSH

Introduction

Many of the most significant developments in human history can trace their origins to specific moments in time and to the influence of specific individuals. This is certainly true of the development of systematic approaches to independent travel for people with visual impairments. There have been a number of significant people involved in this process. There have been different leaders and heroes at different times. This presentation offers an opportunity to discuss the development of orientation and mobility with one of the most significant contributors to this process at one of the most crucial time periods.

Russell C. Williams was blinded in combat while serving in the United States Army during World War II. He went on to serve as a counselor and teacher in the Army's rehabilitation program for other blinded servicemen and women. He established and was the first director of the Veterans Administration's blind rehabilitation center at Hines VA Hospital and he eventually served as the Director of all programs for blinded veterans in the Central Office of the U.S. Veterans Administration.

Russ Williams was a key figure and a leader in the progression of systematic instruction in orientation and mobility from the Army's immediate response to the servicemen and women who lost their sight during World War II to a recognized profession delivering instruction to blind and visually impaired people throughout the world. For his accomplishments, Russ has been the recipient of an Honorary Doctorate from Western Michigan University. He has also received the Lawrence E. Blaha Award for leadership in Orientation and Mobility from Division 9 of the Association for Education and Rehabilitation of the Blind and Visually Impaired (AER), the Ambrose Shotwell Award for national and international leadership in services for people who are visually impaired from AER, and the Migel Medal from the American Foundation for the Blind. Most recently, the Division of Veterans Services of AER has named its outstanding service award in honor of Russ Williams.

In spite of the recognition that Russ has been given, there has been relatively little awareness of the extent of his specific contributions to the techniques and teaching methodologies that

characterize the O&M profession. This conversation with Russ Williams will attempt to highlight these contributions.

The interviewer for this conversation is Dr. Richard L. Welsh, Vice President of Pittsburgh Vision Services.

WELSH: Tell us about your background before you entered the Army and your experience as a soldier before you were wounded. In other words, who was this Russ Williams who has had such a significant impact on our field?

WILLIAMS: Well, I grew up in Auburn, IN, a small town of about 4,500 people. It was primarily an industrial town where automobiles were made. My father was involved in manufacturing and worked in the Post Office. My mother was a housewife. I had 2 sisters, one older and one younger. I was a fairly good student for a while but got off track relative to my school work and started to bring home poor grades. I graduated from high school and worked for one year in industry.

I eventually decided that I didn't want to stay in manufacturing so I went off to college. I was able to get a chance to do this because of high school athletics. I played quarterback on the football team and center on the basketball team. I also placed second in the state in the pole vault. I attended Central Normal College, an independent school that was considered a poor man's college. I didn't have a scholarship, although I was involved again in athletics. I took advantage of a program that allowed me to defer the tuition costs until graduation. I got both a degree and a license to teach. I majored in education and ended up with certification to teach physical education, business education and social studies.

After graduation, I taught bookkeeping in a small high school in southeast Indiana. I taught typewriting and general business but my real love was social studies ever since I had taught world history during my student teaching. My goal for after the war was to make enough money teaching business and physical education so that I could study more and eventually get the credential I needed to teach social studies in high school, but I didn't get a chance to do that.

WELSH: So this is what you were doing at the time you enlisted. What led up to your enlistment?

WILLIAMS: Before going off to college, I had become involved with some of the guys around town who were involved in some of the rough stuff. When the war first broke out, I was a senior in college and the draft board said they would not take us right away but allow us to finish. So I felt out of place not being in the service. I felt that I had to do my duty like all of the other young men. But I was also interested in seeing "the other side of the mountain", so to speak. I wanted to see more than Indiana; so after one year of teaching, I enlisted in 1942.

WELSH: Tell us about your experiences in the Army and the injury that resulted in your loss of sight.

WILLIAMS: I was first stationed at a reception center, but I didn't like that very much. Eventually I moved into the infantry and I felt like I was getting somewhere. I was a light artillery man and they moved with the infantry. My unit landed in France on June 12, 1944 on Omaha Beach in a second or third wave to arrive following D-Day, the June 6, 1944 invasion of Europe. The battle was just ahead of us over the hill, and we stayed close to the enemy for the next two months and were involved in battle every day.

On August 10 I was injured. We were going west into Brittany to open port St. Malo. We were firing on the Germans to try to open that port. I got hit by artillery shell fragments in my left shoulder and just below the temple on the left side. I came pretty close to not surviving that hit. You usually don't get hit that close to the brain and survive.

A doctor and a medic scooped me up after I got hit and gave me immediate treatment. There was a terrible commotion around the aid station. Young people screaming. There were many severe casualties. Four of my best friends were killed. The doctor told me later that he didn't think I would make it. Of course, he didn't tell me that day.

I knew enough about anatomy and physiology to realize that my right eye was completely gone. But I wasn't sure about the left eye. That gave me some hope, but it also dominated my thinking. I was overwhelmed by thoughts of that left eye and whether or not I was going to lose it. Of course, I was bandaged everywhere. I was in and out of consciousness for four days and was in four different hospitals in 4 days.

WELSH: When do you feel that some type of response to your loss of sight began?

WILLIAMS: I was transferred over to England. There I met a doctor who was treating my right socket to prevent infection, but he realized how preoccupied I was with what was going to happen to my left eye and whether I was going to be able to see. This doctor presented the bad news about my left eye in a very honest and supportive way. He said, "Sergeant, I don't have a thing I can do for your left eye." He wasn't too dramatic about it, just honest and straightforward. But he presented this in such a way that he was a real hero to me. Because at that same time he also mentioned that the Army had a program in US for soldiers who were wounded in this way and that he was going to transfer me back to the States so that I could take advantage of that program. He gave me some hope along with the bad news, and I will always be grateful to him.

He also offered to give me a cane so I could get around a little bit, and he offered to put tape on it so I would not hurt the other patients with it. He asked the nurse to give me information about eating. And he mentioned to me that there was another fellow who had a similar condition but his health was too bad and it prevented him from breaking the news to this other patient in this same way and he said he might need my help later.

Even though I had a cane, I couldn't find my way anywhere. I was at that same hospital for a month but had no success finding my way anywhere. I had many harrowing experiences. I bent down to find slippers and the bed disappeared. The thing I feared the most was appear-

ing to be lost, of being conspicuously lost. I couldn't take that. I would just as soon not go someplace as going and getting lost. I hadn't the slightest idea about moving myself.

No one had showed me how to follow somebody. I learned on my own the value of following someone by taking that person's arm and taking a step back. I remember the day I had to go across the street to another building for a medical procedure and no one had showed me how to go safely with someone else. I was still being pushed from behind. Later in my career, I realized that many people never figure that out for themselves.

WELSH: So this seems to be the first example of your developing one of our standard techniques yourself. And I notice that you preferred that it be called the "Following technique" rather than sighted guide. Why was that?

WILLIAMS: I always felt that it was important right from the beginning to put as much of the responsibility as possible on the blind person as early as possible in the training. "Following technique" seemed to communicate that better than "sighted guide". Later at Hines we called it "Use of the sighted guide" hoping to suggest to the veteran to be active and not passive.

WELSH: What do you remember about the eating techniques that you were shown?

WILLIAMS: Not much really. The surgeon was concerned about my using my left arm because of the injuries to my shoulder so he further restricted me to using one arm. A ward boy assigned to feed me didn't realize that I was using my mouth for both feeding and breathing. So every time I opened my mouth to take a breath, he put a spoonful of food into it.

WELSH: From what you said earlier, the doctor's mentioning of a program in the States was real important to you. Can you tell us more about that?

WILLIAMS: Yes, it helped a lot. At the time this injury happened to me, I didn't know if there was another blind person in the army or navy. I didn't know if I was the only one or not. My only former experience with blind people was seeing them in rather pathetic circumstances. People who had chosen to live as beggars or panhandlers. It was not something to look forward to. So it was very heartening to know that I was not alone and that there was help somewhere.

I was also quite happy to be out of close range of the enemy and to be heading home. There was some compensation for getting shot.

WELSH: So had you pretty much accepted the fact that nothing could be done to restore your vision?

WILLIAMS: Yes, intellectually I had bought it, but emotionally at some level I still hung on to the hope that something might still be done for my left eye. I think I held on to that until I reached Valley Forge. But I really had nothing else to hang on to.

WELSH: So how did you get from England to Valley Forge?

WILLIAMS: I came back by way of Oliver General Hospital in Augusta, Georgia where I stayed for 4 days. Actually, our boat docked in Charleston, South Carolina and I was supposed to go to Stark Hospital in South Carolina but that was full so they put us on a train from South Carolina to Augusta. While we were boarding this train going to Augusta, some ladies volunteers got on with shaving items and small gifts and passed through the train in a very pleasant and natural manner passing those things out. Now I didn't need any of that stuff, but I got something else from that experience. This small consideration suggested to me that the country was going to welcome me back and respond positively to me. It was very reassuring and encouraged me to have a more positive attitude.

WELSH: Isn't that interesting. Sometimes we don't realize how important some of those small considerations are.

WILLIAMS: Yes, another example of that came from my trip from Augusta to Valley Forge. I landed in Philadelphia and was taken by ambulance from there out to Valley Forge Army Hospital. And I remember that as a really pleasant trip that helped me feel very positive about the program I was going to even though I still didn't know very much about it. But based on that experience, we always instructed our admissions and intake staff and our greeters at Hines that it was very important that they be as pleasant and as welcoming as possible. You can't underestimate the importance of that first impression in putting a person in the right frame of mind for what comes next.

WELSH: So you arrived at Valley Forge in the fall of 1944. What were your first experiences there?

WILLIAMS: I remember being first oriented to the dorm room on the first day, which was a Saturday, and given a short cane to trolley-up along the rubber mat to find the wash room and the drinking fountain. It was a short distance but it seemed like a major accomplishment to me. By "trolley up", I mean putting the tip of the cane along the edge of that mat and just following it along to the wash room, just like the trolley car follows the trolley.

There was also some very simple and easy socializing that evening. It was not artificial morale building. Once again, the volunteers were very well oriented and did their jobs well.

The next day, a Sunday, there were not many people around. I was encouraged to hear that guys were out on pass. I was visited and welcomed by the chief nurse and by Colonel Jim Greer, the chief of eye service at Valley Forge Army Hospital. I was impressed by this attention. It was Sunday morning and here was the Chief of the Eye Service. I think I started growing at that moment. It was especially important that the chief eye man would show such individual interest in a guy who would have no vision. It gave me a sense that I was important.

On Monday, the ward was busy. It was a regular beehive. I was taken to various medical clinics. I began to meet some of the ward men who had been trained by Dick Hoover. Sgt. Hoover,

of course, had been a teacher at the Maryland School for the Blind prior to joining the service. At this time he was in charge of training special staff in the blindness ward, staff that he called orienters. But the emphasis at Valley Forge was on medical matters.

WELSH: So when did the actual training begin?

WILLIAMS: The mobility training started with an orientation to the ward. I was taught to use the cross body technique with an orthopedic cane at first. The long cane had not yet been developed. Long canes were not available until June, 1945.

I spent time becoming acquainted with the ward and the very long corridors and the regular pattern of the hospital. It was a big place but it was laid out well for the purpose of learning to get around without vision. I traveled using the cross-body technique. I was able to get to the gym and to the medical clinics on my own after a few weeks.

At the time I went through my first training, there wasn't much of a focus on using the other senses nor on outdoor orientation. I was given my first lesson outdoors by Sgt. Hoover. I was shown the basic cane techniques, including keeping my cane-hand centered and alternating foot placement. I was shown everything at once and there were too many details at one time. I was still using a short cane, and I kept missing curbs and drifting off the sidewalk. I felt that too much was expected at one time. It made me madder than hell.

WELSH: From the intensity I can see in you as you talk about that experience, it seems that it was a pretty important one to you.

WILLIAMS: That is true. I was really madder than hell. And the frustration that I felt at the way these complicated techniques were being presented to me I think eventually influenced how I trained the Hines staff to teach. These complicated techniques just had to be broken down and presented in a step-by-step manner with enough time allowed for the person to really absorb the information and to develop some confidence in the techniques.

Mike Gallagher, one of the orienters, was the tester on the unit. His job was quality control. He had to evaluate the guys who had been taught by the various instructors and decide whether or not they were ready to go out on pass. He evaluated me as I was preparing to go home on my first pass. I made a real mess of the test but Mike passed me anyway and I went home for a vacation in the middle of December for a month.

WELSH: That first trip home must have been difficult. What do you remember about that?

WILLIAMS: As it turned out, I was glad that I landed in the east and was pretty far away from home at first. My family was pretty good, but still, I was glad to be far away from them at first. By the first furlough time I had begun to learn a few things and to learn my way around. Hope was coming in here. I had some basis for hope. I had begun to see that life still held some potential for me. I would not have been ready to face family without it. I just didn't know how to present myself before I had this hope. The Valley Forge environment conditioned me for that

presentation. When I went home, I took that hope with me. I saw the positive impact that this had on my family and friends.

I also felt that my background as a competitive athlete and a fairly good student in areas that interested me helped me a lot. I had a good self-image based on past successes and this helped me develop a sense that I could survive this experience.

Also this reminds me of the rest of the story of Otha Claunch. You remember the guy who was wounded close to the same time that I was and we were in the hospital at the same time and the doctor said that he could not break the news to Otha in the same way that he broke it to me. Well, Otha traveled to Valley Forge with me and was there at the same time. We were in the same ward and our beds were about 100 feet apart, but he had to have someone bring him over to visit me when he wanted to visit because he found that distance just too overwhelming.

I remember when I was getting ready to go home on that first furlough, Otha said that he had decided that he couldn't go home. He was worried that his mother who already had one handicapped son to take care of could not have yet another wounded son show up on her doorstep. He seemed that he had not developed a way to cope with and to present his disability. So he stayed behind. Not long after that, however, he contracted hepatitis and was moved to the medical ward, and shortly after that he died.

I said at the time, "You know, I think Otha died of a broken heart", and one of the doctors said that he knew what I meant and that he agreed with me. About a year later when I returned to Valley Forge as a staff member, I was now convinced that I was right and I felt that I knew more about how to help people who were so down on life. I was just sorry that I didn't realize sooner how right I was about Otha so that I might have been able to help him.

WELSH: As I recall, you didn't spend a very long time at Valley Forge after that Christmas furlough. What else happened there for you?

WILLIAMS: I met my wife Jean there, I guess that was pretty important. She was secretary to the Chief of the Medical Service at the hospital and also a Red Cross volunteer who came to hostess one of the dances. We started dating after Christmas and she started to get me out into the community to meet her family and go to various places.

I also started to learn Braille while at Valley Forge. I was already a typist and that helped. I don't remember receiving a lot of specific travel training. I wasn't very good at outside travel and didn't get very many lessons. I remember going golfing and swimming, but it was not a very systematic and orderly program.

One thing to keep in mind about Valley Forge is that surgery and health recovery were the major activities of that hospital. Many patients were involved in plastic surgery, some for as long as 3 or 4 years. There was no way for rehabilitation to take precedence over scheduled surgery. This made it difficult to organize a step-by-step rehabilitation process.

The servicemen who came to Valley Forge with minimal medical needs had short stays. Those with visual impairments were shipped off to Avon Old Farms fairly soon. I stayed on longer because of my sinus and facial injuries.

WELSH: From a rehabilitation perspective, then, it seems that the Valley Forge program when you first went there was not an extensive or well organized program.

WILLIAMS: Yes. That's right. Instead of a major program of technique training, the blinded soldiers, and about 75 to 80% had no sight at all, learned the respectability of using an external aid, in this case a cane. We learned that it was nothing to be ashamed of. We realized that a cane was better than nothing at all, but quite a few went on to get a dog guide. By the way, not all blind soldiers were battle casualties. Some had lost their vision in training accidents or away from the battlefield. Those who were not battle-connected had more difficulty with the adjustment and rehabilitation process.

WELSH: Eventually you transferred to the Avon program. What brought that about?

WILLIAMS: Even though there wasn't a very formal program, I eventually learned to travel fairly well around Valley Forge. There was another guy, Ray Frey, who had been injured early on in a training accident and he had been hired to acquaint the vets with services and benefits. But he decided to resign and go to school for physical therapy. I was recommended for his job. But first they wanted me to go to the program at Avon and after that return to take the job.

WELSH: Apparently there were differences between the program at Valley Forge and that at Avon. What were those differences?

WILLIAMS: Well, as I mentioned earlier, the primary focus at Valley Forge was on medical and surgical treatments. While there was quite a bit of rehabilitation training, it was secondary to the medical treatment. At Avon, the primary focus was on vocational activities. We took a lot of field trips to learn about services and vocational training programs. There was an emphasis on job sampling. We went to see vending stands, the Industrial Home for the Blind, chicken farms and Yale University. I studied advanced Braille and was taught how to interview. We were given experiences in woodworking, auto repair, and factory work at Gray Electronics. We were taught how to study and were provided counseling but it was more like a gripe session.

In general, we were provided a lot of short-term experiences but not enough time was allowed to establish success. There were 190 trainees there by the time I left and the population eventually got up to 200. There were too many to get the kind of benefits that come from a close group of people going through an experience together. It was not a good environment for getting to know the other fellows well and for the kind of sharing that happens in a program and which is so important.

Avon was established by Allen Blackburn, a teacher from the New York Institute for the Blind, Fr. Tom Carroll from Boston, and Jack Levine, a counseling psychologist. There was a certain amount of animosity between the staffs of Avon and Valley Forge. They didn't get along. I don't know why the animosity existed. I discussed it with Fr. Carroll, but we couldn't figure it out. There didn't appear to be any philosophical differences except that canes were not allowed in the Avon program. Instead, Blackburn had emphasized the use of reflected sound in getting around

When I got there, I put my cane aside even though it would have been useful to me because it just wasn't done. But at the end of the program there, I took my cane and went out into the quadrangle and just walked around. I was impressed with the difference that it made for me. This was true even though I had done well with what they were trying to teach me. I worked hard at it and even Blackburn himself told me that I was the best trainee that he had seen in using interrupted sound and reflected sound. But I was not comfortable using only reflected sound. I found any excuse to get my arm in front of me to give me a little protection. I carried my cigarettes in my shirt pocket and would frequently "check" them just as an excuse in an acceptable way to get my arm in front of me to protect myself. I hated to stand out so much and look so obvious, but I didn't want to get my head caved in.

WELSH: It seems to me, then, that Avon was emphasizing a method of getting around that used sound and, perhaps, looked more natural. While Valley Forge, in emphasizing the use of a cane, took an approach that was willing to have people use a cane that made them quite visible as blind people. Valley Forge seemed to take the position that it was impossible to be inconspicuous and still be safe as a blind person traveling around.

Were there any other differences between the approach to mobility at the two programs?

WILLIAMS: At Valley Forge, the terms "orientation" and "orienter" were used. At Avon, showing people around and helping them become familiar with their environment was called "mobility". Eventually we used both terms at Hines. At Avon, the staff focused on the fact that blind people didn't use aids when they moved around their homes and offices. I think they felt that imposing on the veterans the requirement of traveling without aids would force them to develop their other senses. But the setting at Avon was too large for people to do that with ease. It was not practical. It worked up to a point and people probably used their hearing somewhat more effectively. They also forced us to use the tactile senses to be aware of what kind of surface was underfoot, but there was not much formal training. There was some effort to teach the use of reflected sound and to teach estimating distances. But when I was being tested on my ability to stay oriented just by estimating distances based on reflected sound, I was really counting steps or listening to the instructor jingling coins but not letting on. It became a game to try to fool the instructors into thinking we were using what they were teaching us but really we were using other clues. It was not a very good teaching method.

WELSH: What happened after you returned to Valley Forge to join the staff?

WILLIAMS: Well, I was discharged from the service on Aug. 30, 1945 and finished my program at Avon on the same day. The Avon program continued for about two more years after that and closed in June, 1947.

I started as a staff member at Valley Forge on October 1, 1945. When I returned, I started using my cane again, but Hoover, in the meantime, had come up with a long, very light cane made of steel tubing. Those first canes made out of steel tubing had some drawbacks. They would break easily. If they got caught in the crack of a door, they could be snapped off. I was told that about 300 were placed with servicemen during the Valley Forge program, but I didn't get a long cane until much later, sometime in 1946.

Hoover stayed on at Valley Forge until June 1, 1946. We overlapped on the staff for 8 or 9 months. During all of this time, guys were coming through and learning the long cane techniques and Braille. They were also learning some typing and writing skills, and I did some of that teaching. Still the emphasis was on surgery and medicine. There were some occupational therapy services, but really not much rehabilitation activity. There was some music, horseback riding, sculling, swimming, and skating. There was not a systematic, building of skills. You could go to classes if you wanted to but it was not required. There were 360 men at Valley Forge when I arrived back there to join the staff but only about half a dozen teachers. Many patients were there for plastic surgery and it was not wise to risk ruining the results of their surgery by having accidents while learning to get around on their own.

The Valley Forge program stayed open as long as the hospital functioned until spring, 1950. Staff gradually left as they were discharged and I was the last one left teaching. The population dropped from the 360 who were there when I arrived as a staff member to 35 or 40 when I left in February, 1948. While I was there I taught Braille and I did some mobility stuff. I took others out on trips to town for a drink or whatever. I felt that I couldn't teach much. I just tried to help them get some experience and try to keep track of the veteran. There was not as much traffic around the hospital then as there is now. But there wasn't much formal mobility teaching going on during those final months.

WELSH: So when did you actually learn to use the long cane yourself?

WILLIAMS: I had learned to use a cane by holding it in the middle of the body and swinging it to the ground in front of the trailing foot before going to Avon. I was not as skilled as I would become later in this cane use. After returning to Valley Forge, I used the cane in cross-body fashion mostly until Spring of 1946. I was now married and lived in town with Jean. I had to walk three blocks and catch a bus to get to work.

There was a guy from the Signal Corps who visited from Kentucky with the earliest version of an electronic aid that I ever saw and I was asked to try the device. This led to Dick Hoover suggesting that I demonstrate the long cane. Dick saw that I was rusty, but really I had had no cane of sufficient length to be effective for my speed of movement. I quickly saw the value of the long cane. The security of knowing what was on the ground gave me more of an opportunity to use my hearing and my other senses although I still used the cross-body technique

much of the time. Actually the use of a cane-swinging technique was forbidden indoors at Valley Forge. By the time I got to Hines, I had started using a swinging technique, or what has come to be known as the touch technique, most of the time, including while crossing the street.

<u>WELSH</u>: You haven't mentioned much about orientation techniques. Were these being taught at Valley Forge?

<u>**WILLIAMS:**</u> There wasn't much outdoor orientation taught at Valley Forge. During my years living in Phoenixville, which was the town in which the Valley Forge Hospital was located, I went a lot of places with Jean and started doing a lot of exploring around town on my own. I found the touch technique to be especially helpful in these new areas where I wasn't aware of what I might find.

<u>**WELSH:**</u> How about the use of hearing? Were you taught how to do that systematically in conjunction with your travel?

<u>**WILLIAMS:**</u> I think I knew enough about physics and the properties of sound that I was able to learn how to use reflected sound to help in my travels. I remember visiting a farm that was owned by one of my friends. It was a long property that had a couple gates between sections of the property, but my friend didn't go out there much by himself because he couldn't find those gates. I remembered him telling me that there was a piece of machinery besides the gate so I slapped my hands and sure enough I got an echo coming back at me off that machinery. My friend hadn't realized that was possible, but I had been using it all along and showed him how it could be helpful. It was just something that I became aware of, but it hadn't been taught to me directly.

Also when I was in Phoenixville, I learned how to use and teach the use of interrupted sounds to find a bus stop near the filling station. There was an island out in the street at the bus stop. The island had a statue sitting on a bench and it caused a sound shadow as the trucks drove past it. I taught a friend, Bill Thompson, the technique of using interrupted sound to identify the island where the bus stopped. I had realized it myself and used it all the time.

<u>**WELSH:**</u> Tell me again, how you feel your experience as an artillery man may have helped you learn to travel.

<u>**WILLIAMS:**</u> Well, as you know, the artillery crews are usually shooting at targets they can't see. So when I was serving as an artilleryman, I had begun thinking about the various ways that you line up your guns, establish your own orientation and then try to find the targets. You had to be careful about your orientation. Not only would you not be effective in hitting the enemy, but you had to be sure that you didn't hit your own troops. You had to use feedback from the spotters about the accuracy of your first shots and then adjust your direction and the distance of your shot to try to get closer. You had to use azimuth which was a degree of angle away from the North Star and then adjust the altitude of your gun to alter the distance.

So when I found myself moving through an environment, I would be thinking about some of these orientation concepts that we used with the artillery. I would try to keep track of my direction in relation to a distant target all the time and process how each turn affected my direction in relation to that target. I also used these concepts when trying to cross streets in Phoenixville, I would find lampposts or some other concrete piece of the environment that would help me project a straight line across the street. Then I also realized that if I listened to the traffic and where it was going, I could estimate my target, the opposite corner based upon the location of the traffic in the distance as it moved away from me.

WELSH: Was it at this time as you started to use the cane everyday that you started to develop additional techniques yourself?

WILLIAMS: Yes, I guess so, Rick. For example, I started shortening the cane when I found myself in tight quarters, and I found that it would work just as well if I slowed down my pace. I also developed the quick shift from the stair technique to the touch technique when I reached the top of the stairs. Those were a couple that I remembered developing that eventually became a part of our teaching approach at Hines.

WELSH: Before we move on to talk about what happened at Hines, let's review again what we touched on in this previous section about the social context as it related to blindness in which you were developing this new approach to mobility.

WILLIAMS: Prior to the war the percentage of totally blind people in the general population and in civilian agencies for the blind was small. I don't think that there was much awareness of the special needs of people with no useful vision. Most of those who were considered blind really had some useful vision, and they got around fairly well using what Warren Bledsoe called "peeping vision". And I think that this is what influenced the attitude toward the cane at Avon. They tried to treat all blind people the same and, therefore, assumed that if most could get around without a cane all could, even though most of those who got by without canes had some useful vision. Avon, I think, reflected society's attitude at that time that blind persons should be as inconspicuous as possible.

WELSH: But the Valley Forge program changed all of that.

WILLIAMS: Yes, Valley Forge seemed to legitimize the use of a conspicuous tool as a necessary accommodation to one's blindness. This was really true once we started using the long cane. The short cane was an in-between step. Because it was short, it required you to be nonchalant. You didn't get much advance notice of what you were coming to so you had to move carefully and cautiously while trying not to draw too much attention to yourself.

There was very little being done in rehabilitation agencies and in school programs as it related to O&M. After he left the service, Dick Hoover was doing some teaching at the Maryland School for the Blind and some cane instruction was being done at the Industrial Home for the Blind in Brooklyn.

The American Foundation for the Blind started selling long canes. This was the first use of aluminum for the canes. Steel tubing was very hard to come by and we had to switch to aluminum. But since the government could not make what was already available on the market, we had to buy aluminum canes from AFB. They had a rubber core ferrule tip that we thought lacked sensitivity and was too difficult to swing. We drilled them out and replaced then with a wooden tip at first, then a threaded plastic tip.

I took a Valley Forge cane out to Hines with me and used it for the better part of two years until it wore out. At that point I had no choice but to buy one of the AFB canes.

WELSH: So how did you get from being the last instructor in the Valley Forge program to the chief of the program at Hines?

WILLIAMS: Well, Rick, I first got involved in the debate about the need for a continuation of a blind rehabilitation center for veterans in May of 1946. A veteran from Indiana who was a friend of mine had gone through the Valley Forge program and the Avon program and he was still having problems with his adjustment when he got back home. So he called me to ask if he could return to Valley Forge for more training. We accommodated him unofficially, but his presence stirred up the ongoing question about whether we needed to be doing more for the veterans than was currently being done.

We had a staff meeting in which we agreed that the Veterans Administration needed to provide additional follow-up training for blinded servicemen. It was decided that someone needed to take this concern to the Veterans Administration leadership in Washington and I was elected.

When I got to the headquarters and asked to see the top administrator I was referred instead to a Dr. Stenninger in the Dept. of Psychiatry. Also during this meeting Warren Bledsoe who had been transferred to the Central Office of the VA joined us. I knew Warren from our work together at Valley Forge. He had grown up on the campus of the Maryland School for the Blind where his father had been the Superintendent. Warren himself had become a teacher there before the war and, like Hoover, was assigned to Valley Forge when the special program for blinded soldiers was established there.

I was turned off by the psychiatrist to whom I had been referred with our concerns about veterans who seemed to need more training than they were getting. He took the position that there were just some people who would be good at independence skills and others who would not be successful. I could see that we weren't going to get anywhere with him so I stood up and said I thought I needed to go see the chief administrator, General Omar Bradley. Bledsoe supported me in that and went with me to the General's office. Bradley wasn't there, but in his absence, his assistant offered to get the guy from Indiana into Valley Forge officially. This was my first exposure to the controversial issue of starting a center within the VA.

After this visit to Washington, at Warren's invitation I later visited the Maryland School for the Blind along with Archie Farr, a ward assistant at Valley Forge. Archie had come to Valley Forge

as an eye patient and had a recovery of his vision. He stayed on for a while as a member of the staff. We spent two days brainstorming about what a center should be. It was during this conversation that Warren first suggested that perhaps I should lead such a center.

WELSH: Why was the idea of a center within the VA so controversial?

WILLIAMS: A center was not an easy sell because of the experience the VA had with the Evergreen program in Baltimore following World War I. It was felt that the Evergreen program kept people too long and was, therefore, too expensive. What we were proposing to do was not a medical program. It was a long way from surgery. Even though there were some good things that came from the Evergreen program, what the VA remembered about Evergreen was all of the negative things that happened. So there was a lot of resistance to the idea of starting another center within the VA.

As the idea of a center was moving through the system toward becoming a reality, Bledsoe continued to suggest that I should head it up. He and I traveled to Canada to talk to Colonel Baker about what a center should contain. I also attended a meeting at AFB with Kay Gruber, a member of the AFB staff who had been active in support of the program for the returning soldiers, Dr. Berthold Lowenfeld, who was a renowned educator of blind children, and Harry Spar of the Industrial Home for the Blind. At that meeting I suggested that Harry Spar should go out and be the chief of this program, but he couldn't do it because of the programs at the Industrial Home for the Blind (IHB). Also at that meeting, I asked all who were there whether they thought that Braille should be taught in such a program and they didn't have an opinion on that. When I heard that, I began to think that perhaps I had better be the one to lead this program.

Another fellow from the Central Office visited Valley Forge on another matter and he was asking me what I felt a program at Hines would look like, so I described to him what all I thought it should include. He said that all that sounded pretty good but asked if the various classes would be elective or directed. I told him that it would be directed. I felt that everyone needed to have certain experiences if they were to succeed. He thought it shouldn't be directed, but I did.

At one point I traveled down to Baltimore again to talk to Dick Hoover about using physical education teachers to staff such a center, not coaches, but educators. But Dick didn't think so. He felt that the staff should represent a wide variety of people from varying backgrounds. I didn't believe that and so I didn't talk to him about that again.

WELSH: So after all of this stirring and resistance within the VA, it was eventually approved, as we know from Warren Bledsoe's history chapter in the Foundations of Orientation and Mobility, as a result of Bledsoe himself taking it higher up and putting his job on the line. So, how did it happen that the program ended up at Hines Hospital near Chicago?

WILLIAMS: Dr. Hawley, the head of the VA at that time, selected Hines. Dr. Carroll, the head of Hines, said that Hines traditionally had been selected by the VA for programs that they real-

ly wanted to succeed. He didn't seem to realize that the VA had done all it could to keep the center from happening. But the pride reflected in this remark cemented Carroll's commitment to the program.

Hines had a large physical medicine component, but I didn't know much about physical medicine. And there was no model for a short-term rehabilitation program to follow. The only example was Avon, but we couldn't create a center that would handle 200 people at a crack. Besides there were people, including Hoover, who felt that history would show that Avon had been a failure. But I felt that there were some parts of it that were therapeutic for me and that there were many other values. The only civilian models at the time were programs like the Industrial Home and the Lighthouse which were sheltered workshops and that was not what we needed.

We set up the sleeping rooms as individual rooms because we thought the veterans would need a certain amount of privacy. We set the rooms up with a bed, a chifferobe, a table, easy chair, a radio, and, later a talking book machine.

I also asked for an additional building because I felt we needed more space for some of the physical conditioning that we would need to do as well as for some of the mobility training needs. So we got an additional building that also gave us more office space.

WELSH: Given that you were operating without a good model of what this program should contain, I am curious about the content of the program when it first began and the rationale behind it.

WILLIAMS: In the beginning we felt that a veteran's program should consist of two hours a day for mobility (one in the A.M. and one in the P.M.), 2 hours for comunication skills (including typing, handwriting, and Braille,) and 2 hours for manual skills. But it didn't take long before it became quite individualized.

Rationale for the content of the program that we developed went like this. I felt that we needed activities where success could be established using techniques that blind people had found useful in the past. O&M clearly seemed to have a lot of value. Blind people could travel if they were taught properly. Braille had been demonstrated to be a useful skill for life for blind people. The use of power tools seemed to be beneficial. The program could start with simple activities and move to more complicated activities. Success needed to be achieved quickly, perhaps in the first hour. But these activities would only hold a blind person's interest if their usefulness in later life was obvious.

The concept of a successful learning sequence was fundamental and it seemed to me to be common sense. Control of the environment was basic. For people who had lost vision, a substitute method of getting around was fundamental to establishing environmental control. The O&M methods provided that.

WELSH: One thing that seemed to be different from Avon was that Avon focused on work, but you didn't focus on work at Hines.

WILLIAMS: I didn't worry about that. Obviously we wanted clients to choose work, but I didn't feel that we could demonstrate the entire variety of work that Avon tried to offer. We could teach the techniques for study through Braille and communication skills and general concepts of work and taking an organized approach to tasks. But we felt that primarily staff and trainees had to understand the concept of substitutions and modifications for when eyesight no longer works. Braille was a good example. We had to teach them to think about different techniques for accomplishing things that were formerly done by sight. How you can use Braille cards to play poker, for example. All of the practical things we worked on like writing skills, typing, and handwriting were helpful in information gathering and dispensing.

The achievements that the fellows had in the manual arts shop were especially helpful. Frequently, those successes would keep a person interested in the overall program until they got past the plateaus that they were struggling with in other areas of the program like Braille or mobility.

WELSH: What did you do about staffing the new program?

WILLIAMS: Well, first we tried to attract some of the guys who had worked with us at Valley Forge, but that didn't work. But I got acquainted with Carl Purcell the Head of Corrective Therapy at the Hines VA Hospital. We had slots for 5 staff members and Carl thought that his corrective therapists might be able to help because they had experience with all sorts of disabilities. Bledsoe had arranged for higher salary for the blind program staff than corrective therapy. I presented the idea to the entire corrective therapy staff, about 50 fellows, and then the 12 who were interested were interviewed by me, Bledsoe, Kay Gruber, and Charley Chiles, the manual arts teacher brought to Hines from the Maryland School for the Blind.

Among the things we looked for were these concepts:
What did they think about their present job? I wanted to assess their ease of communication. I wanted to see their loyalty to their job and a commitment to it.
What were their lives like? How broad were they? We didn't want any sissies. Because we would be serving mostly men, we felt they should have manly interests. We thought they should have mainstream interests that the other veterans could relate to. I wanted them to be former servicemen themselves.
What was their viewpoint about the worth of their work with people with disabilities. Could they appreciate the accomplishments? Was their work satisfying? Did it have some meaning for them?

WELSH: Once you selected these first staff members, how did you train them?

WILLIAMS: Primarily, we put them under blindfold and taught them the techniques. The use of the blindfold came from work that Bledsoe and Hoover had done at Valley Forge but I don't

know how far back that practice went before Valley Forge. Before the new staff arrived, Warren and I would go out and he would put on the blindfold and I would show him some of the techniques that I had developed in addition to what Dick had been teaching at Valley Forge. This also seemed to be a good way to demonstrate to the new staff that hearing and the new techniques had some value.

I demonstrated the techniques to the new staff myself. Then they would blindfold each other and work on the techniques. Great emphasis on using the full range of senses and sensory information that I had come to realize and use as a blind person myself. The instructors began to figure things out themselves and to experiment with each other on new techniques and bring them back to me.

I was always interested in sound and its motion and teaching the staff about it. I remember that I enjoyed going out and throwing the football to Dee Corbett, one of the original instructors, who would run a pass route while making noises so I could track his movement. We were having fun but also demonstrating to the staff how a blind person could use sound.

WELSH: By virtue of having someone like yourself who had come to realize the full range of things that were useful, your staff had an opportunity to learn all of what might help

WILLIAMS: I think you're right. I was very candid with this group and I told them everything. And they were very candid with each other and were honest about what each other was doing or not doing successfully. Eventually they would come back with observations that they had that added to my information too. They would also give me feedback about times when I was using my cane badly and I would incorporate their corrections and I felt more secure. This helped me realize that the veterans would also get rusty or careless and I would remind them that when things were starting to get sloppy or not work they should go back to what they were taught. Go back to the basics.

The O&M staff also handled daily living skills of hygiene and eating. Recreation was handled eventually by volunteers. Didn't start off that way. First started off with swimming at the YMCA and did some bowling. Later added bingo, card games, dances each week and other things provided by the volunteers.

WELSH: The concept of the job of the mobility instructor at Hines was broader than just independent travel.

WILLIAMS: The concept was broader than just mobility, even though Bledsoe and Gruber talked about Hines as a "mobility center". But I had a staff problem. We only had so many positions to cover a wide range of necessary skills. The challenge was to communicate that all aspects of the program were important while still making sure that the O&M people felt like their program and their service was the best in the world. We required that all veterans had to take all components of the program. This helped keep people in parts of the training that they may not have seen as important long enough for them to get over the hump and feel success in other critical areas that they did not immediately perceive as important. Success and

interest in one area tended to hold a person for other areas, as I said earlier in relation to the manual arts shops.

Sometimes staff wanted to move people along when they didn't show an initial interest in some areas. But I insisted that people stay in certain areas and it worked out that eventually it proved successful. Of course, sometimes it didn't too.

WELSH: Did the staff and you eventually begin to catalogue all of the techniques and teaching approaches that you were using and develop them further?

WILLIAMS: Yes, staff would gather at 4 P.M. each day to write their hospital notes and share the day's observations with each other. Through these discussions they would test out some of these new ideas and force them through the crucible of the observations and experiences of their fellow instructors. Quick and effective communication and feedback were possible because the staff was small enough. Sometimes clients themselves would work out something that the instructors would notice and then pass along to each other.

Together we started to change some of the original techniques and approaches based upon what we realized worked or didn't work and we started to develop some standard ways of approaching the patients.

When it came to orientation, we would start out with the veteran in his room as he was checking in and getting settled. Even as he was unpacking and moving between the bed where his suitcase was and the locker where he was putting his clothes, we would point out ways he could take a line of direction from one object to another to make it easier to get control of the space sooner. We pointed out that by projecting a line of direction from one physical object to another he could establish and maintain his orientation in the room. Taking directions from known things to find other things was basic. This was a skill that could be taught.

After starting in the veteran's room we would go out into the halls and teach similar kinds of spatial relationships. Then we would go outside. We taught the veteran to see the environment in geometric relationships and how to relate everything to these patterns. We were aided by the long corridors of Hines, and there were a number of features of that environment that helped us. In order to keep guys from being "wall-creepers", we had a lesson that demonstrated that the environment had certain features that helped you if you made a mistake. We showed that they could walk down the middle of the hall instead of trailing the wall all of the time. We showed them that if they made a mistake and didn't hear the place where they were supposed to turn, they would eventually come to the end of the hall or some other landmark that would tell them that they had to turn around and go back.

WELSH: So you seem to be saying that prior to you and your instructors working this out at Hines this systematic approach to relating to the environment wasn't typical.

WILLIAMS: No it wasn't. Actually I remember having a conversation with Jeanne Kenmore who was a noted educator of blind children about this idea. This conversation took place in

Denver, I believe, during one of the many seminars we participated in around the country. They were sponsored by the American Foundation for the Blind and part of the purpose was to present some of these concepts about orientation and mobility to the teachers who were working with blind children both in residential schools as well as in public schools.

Miss Kenmore felt that our approach to teaching the students to learn and understand the environment in terms of right angle relationships and to move through the environment systematically from one piece of furniture to another was too unnatural. She argued that this was not the way students would do it. They would angle through the environment and cut corners etc. just like everyone else. I agreed with her that they would eventually learn to do it more naturally, but we believed that they first had to learn it more systematically and as they became more confident in an area then they would begin to move more smoothly and naturally.

WELSH: What are some of the other specific techniques and approaches that you remember developing at Hines?

WILLIAMS: The limp arm technique was one that I remember specifically. I developed it, I think, while at Valley Forge as a staff member. I remember explaining to Father Carroll that I took it from football where the running back was taught to use the limp leg technique to avoid a tackle.

The need for this technique was reinforced by the example of one blind VA employee got killed because he didn't use that technique when he should have. He went across the railroad tracks with someone who was pushing him from behind. It just seemed important to me to get the person with sight out in front so that he put more attention on what was happening in the environment itself rather than on the blind person.

Using traffic sounds to know when to cross a street and how to line up for a crossing was also developed at Hines. We worked first on the premises of the hospital, which were quite large and then we moved into the neighborhood. Early in the neighborhood travel section, our clients had to learn to use traffic sounds for crossings because the streets were pretty wide around there.

Hoover's method for lining up for street crossings was to feel the rounded curb and drop a perpendicular line from it. This didn't work. We abandoned it early on. Sometimes the more physical techniques, like lining up with the base of a traffic light pole did not work, but sometimes they were the only things available. In Phoenixville, as I had said before, I had learned how to use traffic sounds to help me line up for street crossings. So we started teaching these approaches to the veterans at Hines too.

I also remember one of the big training rooms that we had at Hines. It had a door at one end and another door opposite at the other end, and the distance between the two doors was 62 feet. We would have the veterans line up with their backs against one door and try to project and hold a line toward the other door as they walked independently across the room. We real-

ized that this was an important skill to have when it came to crossing streets and we worked on it directly with the clients.

WELSH: It seems to me that an important contribution of the Hines program was to develop systematic techniques that could help every person get as far as he could. While some people had taught themselves certain techniques and could teach others, most blind people would not happen to run into those people who could pass along those techniques.

WILLIAMS: Even some people who turned out to be real good travelers did not learn techniques like these on their own. I remember one fellow came up from Texas in about 1952 after he had completed a Master's degree in Rehabilitation Counseling. He was sharp and as quick as a cat, and once we got his attention to what we were trying to teach him, he picked things up in a hurry. I remember one day when Stan who was working with him realized that he was going to take off with these techniques. So Stan spent some extra time with him to show him some of the danger areas that existed beyond the areas where they had been working in up to that point. Stan knew that in the evening or on the weekend, this fellow would go off and start exploring and Stan wanted him to be prepared for some of the things he might find.

But the point is this. Even veterans like this, clever, well educated guys, did not pick up anything like these techniques on their own or from other blind people during all the years between the end of the war in 1945 until 1952 when he came to Hines.

But I think you are right in what you say about what the Hines program contributed. Techniques teaching methods first started to be written down soon after the program started. People would come to visit and learn about what we were doing and before they left they would ask for lesson plans. But we didn't have them to give. Instead, we had a list of situations that they would use for certain clients at certain times. The sequence was important and to some extent the instructors seemed to develop their own sequence for each client.

A rigid adherence to lesson plans may not have been the most helpful for veterans who were going back home to areas that were nothing like Hines or Maywood, Illinois. Some just had to spend a lot more time accomplishing certain skills before they could go on because they needed that skill in the situations to which they were returning.

During my time we had veterans who were generally young, but there were others who were up to 70 and the pace of the programs had to be individualized for age and disabilities, some with multiple disabilities consisting of arm amputees, bilateral hand amputees, lower limb amputees and severe hearing losses. Some veterans were not going to be able to be very successful and they wouldn't get very far.

Some claimed that they wouldn't need downtown travel because they were returning home too much smaller towns. But we insisted and most often it worked out. Loyal Aldridge was a good example of a fellow who eventually settled in Chicago after arguing that he wouldn't need downtown techniques where he came from.

WELSH: How about the "drop-off" technique. Where and how did that develop?

WILLIAMS: Larry Blaha was working with a Korean vet, Ed Heimrich. I called Ed in one day and gave him a mission but without telling Larry, his instructor. I sent him to find my wife's cousin's house. This was an area where Larry and the client had not worked previously. I told Larry I gave Ed an assignment but I didn't tell him what it was.

I was trying to find a way to prepare a person for getting dropped off at the wrong place because I had been dumped at the wrong place myself. Ed was a good traveler and I was trying to see what would happen and what these fellows could figure out on their own.

This caught on among instructors and they started using this approach for any client who was up to it. It became quite a competition among the veterans and the instructors. The instructors would try to confuse their clients and then drop them off and give them an objective. Some got to be better than Dick Tracy at figuring out the starting point, and it challenged the instructors to find a way to keep the starting location secret.

When Dick Hoover visited and observed this teaching approach, he thought it was cruel.

WELSH: What were some of the other things that you learned at Hines that still affect our teaching methods today?

WILLIAMS: The instructors realized that there were a number of ways they could tell how the veteran was feeling about his travel even without talking to him. The instructors noticed things like how arm swing seemed to be a symptom of security. There were different indicators for different people, of course. Larry Blaha noticed that a tongue sticking out was an indicator of anxiety for one patient while a finger pointing was a signal for another one. The instructors would notice these things and pass them along to the other instructors.

I was fascinated by some of these observations, and I realized that they were one of the advantages that came with having sighted instructors. Of course, there were some things that a blind observer may have noticed sooner such as a sloped surface or certain auditory clues. But generally, I was surprised and pleased at how much these instructors noticed and added to what we knew about the process.

WELSH: Tell me what you remember about using the blindfold for patients who had some remaining vision.

WILLIAMS: We first used the blindfold for training the staff. We also began using it at Hines with clients who had some remaining vision pretty early on. It was never done in anticipation of the loss of additional vision. A lot of people never understood that. Rather we were interested in getting a person to depend more on hearing, kinesthetic clues, and touch. More importantly, we were interested in getting a person to trust these other senses. It was one thing to use another sense but it was something entirely different to trust it. We believed that the blindfold would help the veterans with low vision develop this trust.

Sometimes when the blindfold was used, the veteran thought that his sight had improved after it was taken off. We never thought that it actually had, but perhaps it helped people separate where actual information was coming from. Adding the information received from hearing to the information received from sight helped some patients sort out one from the other.

WELSH: We have talked a number of times over the years about the interaction between the learning of skills by a blind person in a rehabilitation program and the improvement of that person's self-concept. What did you learn from your experience about which came first?

WILLIAMS: Well, that's a good one. I had quite a difference of opinion with Fr. Tom Carroll about that. We agreed to have different views. At Hines we placed more emphasis on doing things, while Fr. Carroll had more emphasis on counseling first.

In a center like Hines, while a patient was involved in doing things, he was associating with other fellows who were also doing things. They all come in as "doubters", they just didn't expect to be very successful. But they had plenty of role models available both on the staff and among other clients. Each day, their notions about what life could be like was revised. Each day they heard about another blind person doing something else that they thought was impossible. But for many soldiers you had to prove to them that the techniques would work before they would accept it.

I remember one patient who heard stories from more experienced patients about drivers brushing their shirttails when turning the corner behind a blind traveler who was crossing the street. And he stopped me to ask about that and it was clear that he was quite worried about what might happen to him. I told him that the other guys had had more experience and they liked to brag and exaggerate about what they had experienced. But that his experience might be different and he would just have to take the time and give it the time and see what happened. But that he would learn to handle these situations one at a time and it would take time but that he would not be asked to handle something that he would be unable to handle. And I asked him to give it time, and he did.

As they began to have success, you could see changes in the fellows. I remember one fellow who had some serious psychiatric problems that were related to his adjustment and he was a mess. His hair was a mess and his clothing was all disheveled and he never had his shirt tucked in his pants. I remember one day after he had been in the program a little while, an instructor stuck her head in my door and said, "His shirt is tucked in today." And that was the first sign that we were beginning to make some progress. And the better he came to feel about himself, the better he started to look.

I also remember a friend of mine who was an administrator in another part of the hospital but he used to see our blind patients traveling throughout the building and in the dining room. One day he asked me, "Do you teach posture in the blind center?" I told him we didn't but asked why he asked the question. He told me about how he would notice new blind patients walking around and he frequently felt that they looked unhealthy and down in the dumps. They just didn't look right. But after a while, he noticed that they started to look much better. Their pos-

ture would change. They held their heads up. "What accounts for that?" He asked me. I told him that what he was observing was the effect of their beginning to dissipate their doubts about the wholesomeness of life. As they progressed through the program, they began to feel more confidence in what lies ahead.

WELSH: Your experience and observations about what worked for people during that program seems to be borne out by some recent research about the concept of "self-efficacy". This is a more specific focus that the general concept of self-concept, and it focuses on a person's sense of whether or not he can perform a specific task successfully. Most of a person's ability to improve his sense of self-efficacy is related to having success in doing the task that is in question. Another portion of that improvement in a person's self-efficacy, however, is due to having effective role models, other persons similar to himself who are also accomplishing the tasks that are in question.

WILLIAMS: That seems to be borne out in our experience at Hines too. I used to travel to work everyday by myself on a bus. And I would stop at the desk each day on my way in to see how things were going, and it was important for the patients to know that I did that every day. So I guess that I was a bit of a role model for them.

Also our patients came into the center as space permitted. So we always had a mixture of new people and experienced people. So the new people would sit at the table and be struggling with the proper eating techniques and they would be sitting next to a patient who was doing better but who could tell them that they too had been struggling just a few weeks ago. It gave them hope. So I guess they were role models for each other too.

Part of the mobility program was getting our veterans started in mobility immediately. Most of them when they came in didn't know that moving from place to place effectively was possible. They didn't know that they could do it and even enjoy doing it. But they learned to do it by having success in their early learning experiences. We had to make sure that the things they were involved with early on worked. If you waited for them to develop that awareness first before learning to do something, I doubt that it would ever develop.

WELSH: This reminds me of those who espouse another approach to learning mobility. That approach seems to start with putting people out on the street in a pretty advanced or difficult environment first as a way of showing your confidence in them and of minimizing the problems of travel without vision. Its kind of like teaching a person to swim by throwing him in the water without any lessons and letting natural survival instincts take over. There is a certain percentage of people for whom this works, but there are lots of others who become so frightened by this approach that they never learn to swim. The approach to learning mobility that you developed at Hines seemed to be designed to help each person get as far as they can.

WILLIAMS: There are all kinds of illustrations of the value of this approach, of starting small and building up success experiences. You don't start a freshman football player with the seniors. You have to start with a realistic way of doing it. You can't put a person on every street corner to save a person from mistakes he might make when he hasn't learned how to handle

these mistakes himself. You have to have success first and begin to believe in it as a result of these successes.

WELSH: Lets talk a little, Russ, about training instructors from other places. People began to hear about what you were doing and started sending people to observe and to learn to do what you were doing at Hines. How did that work?

WILLIAMS: People would come for various amounts of time. They were mostly from private agencies, other countries, and other VA facilities. We could tell that these were not the best people that they were sending and many were barely interested in what we were doing. We honored our responsibility to let them observe a federal program, but we knew that we could not make O&M trainers out of people on this basis. We tried our best, gave them blindfold experiences, and took time away from our own clients, but we knew that this was a disservice for the field of work for the blind. We couldn't guarantee results because we couldn't screen the applicants and keep them long enough. We started to feel ashamed about it and to feel that we were doing a disservice to the field.

In 1953 when Stan and I went up to Boston to attend the Gloucester Conference, we stopped to visit one of Fr. Carroll's staff who had been through he training at Hines and who had spent about three weeks with us which was more than most. When we got there he approached us to discuss a client who had progressed to a certain point in the training and was doing pretty well and then one day decided to dropout and didn't even want to talk about it. This instructor wanted to know from us what was wrong. It seemed clear to us that this instructor didn't know how to pace the learning. He just hadn't been in training long enough to pick up that particular skill.

We continued to do what we could from 1953 to 1959. Eventually there was a meeting at AFB in 1959. Warren Bledsoe was now at HEW and that brought the VA and the HEW together. Lou Rives came along and became a believer in what we were trying to do. At the AFB meeting I pushed for courses in anatomy and physiology of other sense systems which to me seemed so much more important than anatomy of the eye, but I lost that one.

I also pushed for the training program to be on the graduate level. I felt that because the mobility instructor had to deal with doctors and other professionals, we needed a graduate level of training to try to make our people comparable. We didn't want those other people looking down their noses at our profession. I didn't want our people to be stepchildren among other professions. I also felt that because our people would be taking courses with other teachers they should be on the same level and they would have to inspire enough confidence in themselves to attract referrals from other professionals.

WELSH: So you won that point and the first training programs were set up at the graduate level. Were you pleased with how things progressed from there?

WILLIAMS:
Fr. Carroll got the first grant and set up a program at Boston College. HEW became aware, however, that the students weren't getting any practicum experience out on the street under blindfold. It was all classroom learning at first. A critical report was filed by an HEW staff member and some changes had to be made to make it more practical. It seemed like the first effort of the Boston College program had been geared more toward training administrators than mobility instructors.

Around that same time, Dean George Mallinson of Western Michigan University learned about this opportunity and approached me about it. By this time I had transferred to the Central Office of the VA in Washington and Mallinson asked if I would go with him to HEW when he presented his case. I reviewed with him what the university was prepared to do to make the program work and I was very impressed with his approach as was HEW.

Dean Mallinson offered me the job of establishing the program, but I turned it down. I didn't feel like a university person. Instead I suggested that I would help him find someone among the VA staff to help him start up the program. I felt like we were casting bread upon the waters and that this would eventually come back to help us.

There were a number of people who suggested that Stan Suterko should be the one to head up such a program, but I was worried because Stan didn't have an advanced degree at that time. Instead I convinced Don Blasch to take on the job because he already had courses between a masters degree and doctorate and might be able to relate better to the other university people. I flew to Kalamazoo and drove to Chicago with Dr. Mallinson to talk further with Don Blasch who wasn't really interested in the job. I had to really twist his arm to get him to take the job. But once he took it, he really got into it.

I felt that once the university programs were running the VA could get out of the training business and hire ready-made instructors. So this was important both for the VA itself as well as for other agencies.

WELSH: At any point during these 16 or so years when you were involved in establishing this profession did you have any idea that this would become a specialty that would have such a far-reaching effect on the field both in the United States and around the world?

WILLIAMS: I really didn't know. I had no idea. In 1956, I attended an international meeting of 19 countries in England on prevocational programs. I didn't want to be too pushy. I brought along and showed the film The Long Cane. Some were interested, but the British just barely tolerated me. They were polite but not enthusiastic. The man who introduced the film said "Once you watch this film, you will see why Russ Williams is walking around with a big piece of structural steel."

Also in England there was a US financed Center at Torquay and they hired a first year graduate of the Boston College program who had been recommended by the Foundation. The blind

center director who was blind fell down the stairs while going through the training which he was doing against his better judgment. That didn't help the acceptance process.

Then later Al Leonard came over for a visit and I got into quite a chewing match with him and challenged his research approach. I told him that I felt that he was trying to do research that would demonstrate that mobility training wasn't necessary by asking people who didn't know anything about it. Of course he denied that and we fought it out and eventually became good friends as a result of telling each other honestly how we felt about things. I liked him a lot but he died too soon.

Later Stan Suterko went over and I don't think there is any nation on the face of the earth that could resist Stanley Suterko. He succeeded in establishing Britain's O&M program.

WELSH: There's one other issue that I wanted to ask you about. The AFB conference in 1959 that you attended and at which you successfully argued for the training to be on the graduate degree level was also the one that stated clearly that the instructors had to have vision. Of course, this has become a very controversial issue in our field and has become more so as a result of the Americans with Disability Act. What was behind this decision in 1959 from your point of view?

WILLIAMS: As an administrator, I felt that we couldn't run the kind of program we were running without the help of sighted people. First of all there was the practical concern about driving. They couldn't get to the areas where they needed to work without driving. Secondly, I had tried to teach mobility myself at Valley Forge when the staff had been depleted and there was no one else to do it. I realized that I could not do the whole job by myself. I brought this conviction to Hines.

Also, I had not been at Hines too long before I became aware that some of the patients who were coming into the program had the potential to be much better travelers than I would ever be. This is very difficult for a blind instructor to handle.

However, I did find this out. On a staff that has a large enough number of people, there are times when a blind instructor could be very helpful. One such role could be demonstrating crossings at difficult intersections. This could help convince a hesitant client that it could be done. I sometimes helped out when a client got stuck at a particular point in the process. This usually happened at intersections. I would go out with the client and I would cross first and be waiting for the client on the other side after he crossed. This was particularly helpful with one client whom we knew had enough hearing to handle a crossing but seemed to be stuck. I think his witnessing my crossing helped to keep him in the program.

WELSH: One of the other points that is discussed in this debate about blind versus sighted instructors concerns the need for an instructor to separate from his client enough to be distant and still assure a client's safety. How important was it for a client to experience this separation?

WILLIAMS: It gets to be quite important that the instructor separate himself from the client during the training. It's important that a client be allowed to make mistakes and bear the consequences. But the instructor still has to be able to assure the client's safety. This was the point that William Debetaz of the Seeing Eye made at the AFB conference. When he was asked what a sighted instructor could do in a danger situation that a blind instructor could not do, Debetaz said that the sighted instructor could see the danger coming and yell "stop" if necessary.

The client has to get the impression that he is on his own, but you couldn't actually let him be on his own both for learning and safety purposes.

We did use solo lessons a little at Hines, but it could be overdone. Not much teaching goes on when that is the case. This might be done if you have plenty of time, but if you don't, you have to use your time more wisely than that.

Summary

WELSH: As I think about all that we have talked about and especially about your role in the development of our profession, there is a an impression that I have developed that I would like to try to put into words as we close out this session.

Over the years, Russ, as you know, the profession of orientation and mobility sometimes has been accused by some blind people of being a group of arrogant sighted people intent on deciding for blind people and telling blind people what is best for them in the area of independent travel. If that is true of any of us, it is not consistent with what we were taught nor with the roots of our profession as they have been reflected in our conversation.

Rather, the techniques that we teach and the methods that we use to teach them are very much a reflection of your experience as a blind person. So much of what we do and the way we approach our teaching can be traced directly to your experiences in learning to cope with your own loss of vision and in reacting to the ways in which people first tried to help you. So much of our methodology flows from what you taught that first staff at Hines and the ways in which you and they further developed these techniques and teaching methods as you worked with hundreds of blind people over the years.

It seems to me that this profession, rather than being an ivory tower group guided in an a priori way by a lot of theory, is well grounded in the experience of blind people. It is faithful to that experience as it was articulated by you and passed on to those first mobility instructors at Hines who were the first to be thoroughly and systematically trained in this approach.

The basis of the remarkable success of our approach came, first of all, from the experience of at least one person, namely yourself, who actually went through it and was successful at it. It was further developed through the success of the people who were taught by you, who

learned from you, and who had great respect for you. They then passed along that teaching and that respect for what blind people can do to the people they taught.

This profession is built on that solid rock of respect for the blind person who can do these things. The people you taught at Hines learned techniques from you. More importantly, they learned to respect the ability of blind people by associating with you. If the university training programs and the practicum and internships are operating properly, this same approach is passed along to each mobility instructor who enters the field. If we can, in turn, communicate that respect for themselves to the people we teach, consistent with what we were taught, that is one of the most important things we can do. There is a definite circularity to it.

We need to be involved in a real partnership with the blind person whom we serve. That's the pattern that you established, and to be good at this profession we have to teach that way. So much of this started with you and you taught your instructors not only the techniques but the respect for what blind people can do. They, then, pass those techniques and especially that respect along to the people they serve. And, of course, this is the essence of all kinds of good teaching.

WILLIAMS: Ten years ago, I attended a meeting of the Illinois chapter of the Blinded Veterans Association. It was the occasion of the 40th anniversary of the establishment of the Blind Rehabilitation Center at Hines and I was asked to talk about who was responsible for the success of the Hines program. At that time, I tried to make the point that the real heroes who were responsible for our success were those blind fellows who had to wade through the snow and mud and cross the streets when they wondered if this made any sense.

Now these heroes did what they did primarily because in the beginning they trusted the staff. These first mobility instructors with whom the patients had been associating since coming to the center believed in them and felt that they could do it, that they could succeed.

I have frequently described the staff of the blind center as the believers who were placed in a role between two sets of doubters. One set of doubters was the society who doesn't expect much of blind people. The second set of doubters was the blind people themselves who come to the center and who didn't expect much of themselves. Clearly the heroes were the clients who put themselves out there and who tried to do what the staff encouraged them to do. But these heroes succeeded because of what the staff coached them and advised them to do, which, by the way really worked. And, most of all, they succeeded because the staff communicated to them that they could succeed, that they had the ability to succeed, and that the staff fully expected that they would succeed.

If it weren't for the staff people who came to believe in these techniques and teaching methods and who kept that belief alive and passed it along, each next generation of blind people would not have had the opportunity to also experience this success and develop the confidence to travel independently. If it were not for these believers and their successors this chain would not have continued nor would continue.

If mobility instructors don't come out of their training programs and radiate this philosophy, they won't be worth much. The real heart of what we do is in this belief and in coaching and helping people to believe in themselves.

THE USE OF REMOTELY TRIGGERED TALKING SIGN SYSTEMS BY BLIND AND PARTIALLY SIGHTED PEOPLE

GILL WHITNEY
Joint Mobility Unit
Royal National Institute for the Blind
London, United Kingdom

During 1997 and 1998 over 200 blind and partially sighted people were observed using three different talking sign systems. The systems were situated in six different metropolitan train and bus stations in London, Paris and Rotterdam. The talking signs were set up so that the user could find and follow a route within the station or between different areas of the station. The aim of this paper is to describe how the technology was used, how the users were selected and the results from these trials.

The Evaluation Sites and Equipment

The first system which was evaluated was the OPEN (Orientation by Electronic Navigation) infra-red talking sign system. This was produced and evaluated as part of a European Union Tide Project. The aim of this project was to guide blind and partially sighted travelers through four metropolitan railway stations. The stations selected for the trials were, South Kensington and Heathrow Terminal 4 underground stations in London, Chatelet underground station in Paris and Blaak station in Rotterdam.

The OPEN system consisted of infra-red beacons fixed throughout the station and a receiver carried by the user. When the user came within range of the beacon a message was transmitted from the beacon to the user device and spoken to the user via a set of headphones or a small speaker. The OPEN beacons were both multi-channel (different language messages could be broadcast at the same time) and networked (messages could be downloaded from a central computer). The other two systems evaluated were the REACT radio frequency system and the Pathfinder infra-red system. These systems were evaluated as part of a project funded by the Bridgehouse Trust in London.

The REACT system was evaluated at Golders Green station in London. It consisted of radio frequency beacons and speech units installed throughout the bus and underground station and a small card carried by the user. When the user walked into the range of the beacon, the speech unit is triggered and a message broadcast. The system was set up so the user triggered the beacon from approximately 5 metres. The information from the message and the information obtained from the direction where the message came from enabled the user to navigate through the station.

The Pathfinder system was evaluated at Hammersmith bus and underground station in London. It was an infra-red radio frequency system in which the user heard the message via a small speaker or set of headphones.

Selection of Trial Subjects

The trial subjects were selected with the aim of getting a representative sample of mobile blind and partially travellers who would benefit from the introduction of these systems. This meant that for the trials people who already travelled independently using a single station or a range of stations as well as those who do not currently use stations but who had the mobility skills to use them safely were required. Three groups of people were identified as fulfilling these criteria:

- Blind and partially sighted people who currently use familiar and unfamiliar stations. It was hoped that the technology could benefit this group by enabling them to travel more easily and efficiently with less stress.
- Blind and partially sighted people who currently use only familiar stations. This group would benefit if a talking sign system enabled them to travel freely within the bus and train systems rather than just use routes they know well.
- Blind and partially sighted people who currently do not travel on public transport because of fears of getting lost in stations.

Pre-trial questions were asked of each volunteer subject to place them in one of the above categories. As far as was possible each group was set up to contain male and female travellers of varying ages who used a variety of mobility aids or no aid and who had a variety of sight loses. Each volunteer had to be able to move safely in the station environment. It is interesting to note that for these trials approximately 70% of the volunteers had had mobility training, this is greatly above the national average in the United Kingdom (insert figure and reference here). It is not known what percentage of blind and partially sighted people who would make use of remotely triggered talking sings have had mobility training.

The Trials

Two different methods were adopted to evaluate these systems. The trials of the OPEN system consisted in a user travelling through the station using the system whilst being followed by an evaluator. A questionnaire was completed following the trial and observation of the users journey through the station noted. For the evaluation of the REACT and Pathfinder systems the above method was followed with those volunteers who did not regularly travel through the trial station. The regular (and very competent traveller) volunteers were asked to take part in a long term evaluation of the systems were they used the system regularly for a period of eight weeks.

Results from the Trials

The Trials of the OPEN system finished in September 1997, the trials of REACT and Pathfinder are still being carried out as this report is being written. This section will therefore contain a description of the OPEN results and some impressions of the other trials. From the OPEN project it was discovered that the majority of the users (91%) felt that the system helped them to locate relevant features of the stations used. This was in spite of some technical problems with the system which caused:

1) the range of the beacons (both length and width) to be less than needed to “catch” the user as they walked past.
2) the volume and quality of the messages to be of insufficient quality for all the messages to be understood by all the volunteers.

The different methods of evaluating the REACT and Pathfinder systems has lead to information being gained on the users feeling about the systems as well as how well they can use them. The trials of the REACT system have been the most successful with all the users (including some with slight hearing loss) being able to hear the messages. With both systems there have been a number of volunteers who do not want a technical solution and would prefer a sighted guide and some who have problems with the general nature of the spoken message.

Conclusions

The main conclusion from these trials is that these signs can be of benefit to blind and partially sighted people. To this conclusion two provisions should be added:

1) The signs will be of most benefit if they were used as part of a complete system of environmental adaptations. By the use of tactile guide paths with a number of remotely triggered talking signs, the user could be guided to the best position to receive the message.

2) Where possible training in the use of these systems should be provided as part of the users mobility training. Special consideration needs to be made for the large number of people who have not undergone mobility training.

ADAPTED MOBILITY FOR PEOPLE WHO USE AMBULATORY AIDS

SANDRA ROSEN, PH.D.
San Francisco State University
San Francisco, California
U.S.A.

Orientation and mobility (O&M) specialists are increasingly being called upon to serve not only people with visual impairments who are physically able, but also those who have physical disabilities. Many people with visual impairments have medical conditions, either related or unrelated to their visual impairment, that limit their ability to walk long distances or their ability to walk without assistance.

Ambulatory aids refer to the wide range of appliances that people use when they need physical support to move in their environment These aids include such devices as wheelchairs, orthopedic canes, crutches, and walkers. While a wheelchair may not be an "ambulatory" aid in the strictest sense of the word, it does provide some people who have ambulation difficulties a means of mobility, and in that regard, can be considered an ambulatory aid.

Who Uses Ambulatory Aids?

In general, people use wheelchairs when they are either unable to walk or when they have limited endurance in walking. Others, who need physical support to walk, may use walkers, crutches, or canes. Some people may even use a variety of aids over time if their physical condition is such that they either experience an improvement due to healing or to the benefits of therapy, or experience a decrease in function due to the effects of a progressive disorder.

Mobility With Ambulatory Aids

There are three basic elements of travel for all people, whether sighted or visually impaired, ambulatory or not. They are: a) orientation, b) negotiating obstacles in the travel path, and c) detection/avoidance of hazards. Inherent in these elements are factors such as safety, quality, and efficiency of movement. Due to the effects of impaired balance, however, sudden changes in terrain or unexpected contact with obstacles in the travel path can sometimes present serious challenges to people who use ambulatory aid(s). This paper provides ideas on enhancing the ease and safety of travel by people who are visually impaired and who use ambulatory aids through the use of electronic and non-electronic mobility devices. It also reviews common approaches to using ambulatory aid(s) themselves as mobility devices. While the approaches presented by no means represent the entire spectrum of possibilities or even of mobility skills, it is hoped that they will stimulate thought and creative approaches to facilitating independent travel for those who have visual impairments and who use ambulatory aid(s).

Basic Obstacle Detection

One of the greatest challenges in travel encountered by ambulatory aid users who have visual impairments is the quick avoidance obstacles, hazards, and drop-offs in the travel path. While wheelchairs, walkers, crutches, and canes do not safely detect drop-offs, the list of innovative ways by which they can detect other obstacles or hazards is endless. For example, in order to avoid unexpected and potentially painful contacts with walls, up steps, garbage cans, furniture, and other objects, people who use wheelchairs can purchase footrests that are longer than the their foot. To detect obstacles at waist height, a lap tray acts as an effective bumper. Similarly, collisions with objects on the side such as walls, doors, counters, etc. can cause scrapes, bruises, and painful bumps when the hands are unexpectedly caught between the metal pushing rim of a wheelchair (or handle of the walker) and the object. One solution is to place flexible curb feelers (or other flexible rod) on the wheelchair post above the front wheel or on the front leg of the walker. The curb feeler will gently scrape along the wall or other vertical surface beside the traveler before he or she is close enough to contact it with his or her hand. The curb feeler also makes an audible signal as it slides along the surface or object. This sound varies according to the surface being trailed (e.g., wood, brick, glass, metal), and in doing so, also provides helpful information for orientation. Curb feelers, when positioned at a 45 degree angle backward (rather than perpendicular to the traveler's path) will gently slide along a surface without scratching it and will bend backward when traversing doorways, thereby not blocking passage.

Use of crutches and canes to trail and as probes

Some people who use crutches or canes may possess sufficient strength, coordination, and balance to support themselves on one crutch or cane while using the other as a probe. For example, the traveler might place his or her weight on one crutch while placing the tip of the other crutch across his or her body, then sliding it in an arc back to it's original side, in position for the next step. This clears a one-step distance ahead. To trail, the user simply taps the tip of the aid against the wall or vertical surface being trailed, then places the aid forward, in position for the next step. For the traveler who does not have sufficient vision to preview the area ahead, an important rule to follow is step up only to where the crutches or canes have cleared, and never beyond.

It should be mentioned that while many travelers can effectively use crutches or canes as probes, teaching a student with a visual impairment to use these aids to clear a path and to trail should only be done with the advice of, or in conjunction with, a physical therapist. This is to ensure that the procedure can be done safely and will not cause excessive physical strain to the traveler or potentially aggravate an existing medical condition.

Use of the Long Cane with an Ambulatory Aid

The use of the long cane by travelers who use ambulatory aids is really not as complicated and formidable a task as might be imagined. In order to leave one hand free to hold the cane, people who use wheelchairs may choose to use a motorized wheelchair or a means of propelling a manual wheelchair with one arm (e.g., using a foot to steer while propelling with one hand or using a wheelchair designed to be propelled with only one arm). Travelers who use a

walker may use a walker designed for use with one arm, thereby leaving one hand free to control the long cane. If necessary, travelers who use ambulatory aids may use a cane that is longer than the standard length if additional reaction time is needed or, they may choose a shorter cane if their travel speed is very slow.

Travelers who use a long cane in conjunction with either one crutch or one support cane always hold and use the crutch or support cane in the hand dictated by their support needs (generally on the side opposite the weaker leg) and hold the long cane in the other hand. This is true whether or not they are left- or right-handed. The long cane is then used in a traditional manner with the hand and arm position remaining the same as when using the long cane alone. The travelers keep "in step" with the long cane as they walk, contacting the cane tip to the ground on one side as the foot on the opposite side steps down.

Travelers who use a long cane in conjunction with an ambulatory aid generally leave the tip in contact with the ground at all times. This is done to increase detection of even subtle terrain changes such as slight drop-offs, bumps, slopes, or grass which can impact the stability of the traveler or the maneuverability of the wheelchair. Marshmallow tips, roller tips, or ball tips can be effective in minimizing the chances of the cane tip sticking in sidewalk cracks or rough surfaces. The traveler may also make a wider than normal arc with the cane, because it is important to cover the width of the wheelchair, walker, or other aids in addition to one's body width.

<u>Use of Electronic Travel Devices/Environmental Sensors</u>

Last, but not least, many electronic travel devices or environmental sensors (e.g., Mowat Sensor, placed on its side and clamped to a wheelchair tray, or otherwise secured in a position in the user's midline; Sonicguide; Sonic Pathfinder; KASPA; the Russell Pathsounder; Wheelchair Pathfinder; Sensory Six; Polaron), when positioned and adjusted correctly (to avoid detecting the ambulatory aid(s) or legs of a traveler using a wheelchair), can provide some obstacle detection. The Wheelchair Pathfinder by Nurion will additionally detect downcurbs or down-stairs that are directly ahead of the traveler using a wheelchair.

<u>Choice of Equipment</u>

The choice of ambulatory aid(s) to be used by a given person is generally made by a physical therapist. It is made based on several interrelated factors such as the person's age, balance, coordination, muscle tone, need for postural support, presence of sensory impairment, medical diagnosis and prognosis, endurance, and level of activity. At the same time, however, the requirements of orientation and mobility such as reaction time when encountering obstacles, the effect on balance of unexpected collisions with objects, and early detection of steps and changes in terrain are factors that must be considered in prescribing ambulatory aids. It is therefore important for O&M specialists and physical therapists to work in concert, whenever possible, to prescribe aids or to revise a system so that it meets both the physical support and independent mobility needs of the traveler with a visual impairment.

<u>Need for Future Research</u>

While this paper presents some approaches to facilitating independent mobility by travelers who use ambulatory aids, there is a great need for controlled studies to explore options and

to develop technologies for this specific population. Suggested studies are those that might focus on the development of an electronic device to detect down curbs on a traveler's side, or perhaps a means of incorporating obstacle detection directly into an ambulatory aid. Also, while this paper did not focus on the difficulties in monitoring straight-line travel that are experienced by blind travelers who use wheelchairs, this is a significant problem for many people and is an additional area of much needed research.

EVALUATION OF THE BIELEFELD PRECANE FOR BLIND INFANTS AND PRESCHOOLERS

ANJA KUHLMANN, MICHAEL BRAMBRING & MATHIJS VERVLOED
University of Bielefeld, Germany

Through the loss of vision, blind children are disadvantaged in their orientation and mobility behavior (Brambring et al., 1994; McGowan, H. E., 1983). For example, walking speed is slower, steps are shorter, legs and toes face outward, and posture is impaired. But locomotion and mobility are of crucial importance to young blind children, because they enable them to get to know their environment, develop muscle tone and coordination, and make contact with other persons.

To counteract this, it is necessary to commence orientation and mobility exercises with blind infants and preschoolers as early as possible (Pogrund et al., 1992). However, opinions vary regarding when and in which form aids can be introduced for locomotion outdoors (Bosbach, 1988; Clarke et al., 1994; Pogrund & Rosen, 1989). Studies with specially constructed precanes show that the use of an precane leads to qualitative and quantitative improvements in walking (Morse, K. A., 1980). Clarke, Sainato, and Ward (1994) have compared the use of the Connecticut Precane (Foy, C. J., Scheden, M. & Waiculonis, J., 1992) with the use of the long cane. They found that all children used the precane more confidently and effectively than the adult long cane, so that—with certain reservations—it can be concluded that it is more appropriate to use a precane than a long cane with blind infants. Naturally, these findings cannot be generalized to all preschool canes for the blind.

Based on this knowledge, the Bielefeld Precane was developed as one of the results of 10 years of research in the Bielefeld Early Intervention Project. The cane is easy and cheap to produce and is constructed with an aluminum pole (reducing its weight to circa 200 grams). We decided not to use a telescopic pole in order to keep weight down. At the top of the cane there is a crossbar so that the child can hold it with both hands. At the bottom, there is a small wheel so that the cane can be placed on the ground and can glide over it as easily as possible.

With the help of the cane coordination of movement and balance should improve so that, for example, steps become longer and the foot is unfolded completely. Furthermore, the precane should give children a feeling of confidence that should also generalize to walking alone—that is, a transfer should occur aimed at increasing the motivation to walk unassisted as well.

The precane should enable children to improve their early ability to recognize changes in the structure of the ground. It is not designed to detect obstacles but focuses on the pure joy of walking. Potentially frustrating experiences that could be associated with obstacles should be avoided. One exception to this is curbstones: With the aid of the precane, children should be able to cope with these confidently.

In order to test the design of the Bielefeld precane empirically, we have carried out a 1-year study of walking behavior in blind children. 15 children, 4 female and 11 male from Belgium, Germany, and the Netherlands were participating in this study. They are currently aged between 32-69 months (M=48 Months). 14 children are completely blind, one has light perception. They have no further serious physical impairments. 10 children were born full-term; 5 were born pre-term with a birth-weight of 835-2000 g (M=1191 g).

The study has a longitudinal design. The children's walking behavior over a distance of 120 m was being recorded with a video camera at 3 waves. These were (1) 4 weeks after introduction of the precane; (2) 6 months after introduction of the precane; and (3) 12 months after introduction of the precane. Walking behavior was assessed under three different conditions per wave, balanced across children and waves. Comparison of the three empirical conditions should provide information on the usefulness of the precane in comparison with unassisted walking and guided walking. Walking behavior is assessed by rating the videorecording according to quantitative (walking speed) and qualitative criteria (posture). The 1-year period of observation should also permit the observation of changes in walking performance over time. The results will be presented.

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ORIENTATION AND MOBILITY FOR MULTIHANDICAPPED VISUALLY IMPAIRED CHILDREN. THEORETICAL AND ESPECIALLY PRACTICAL LECTURE IN DESIGNING A PLAYGOUND

ANNE NORDSKOV
Refsnæsskolen, National Institute for Blind and Visually Impaired Children Kystvejen 112, DK-4400 Kalundborg, Denmark

Orientation and mobility for V.I. children with severe disabilities has never been easy, and the surroundings- in particular O and M instructors - have difficulties finding methods which fit this group exactly. It is often heard that V.I. children with severe disabilities don't need mobility and put on a list of priority- it is always put at the bottom! Thinking of traditional mobility strategies only, it may be right, but if we look at each child's developmental potential and combine the theory, we might be able to come up with new ideas and strategies. The theme of this conference, O and M moving into the twentyfirst century, in my opinion is ideal if at the same time we move O and M resources to the benefit of the group of V.I. children with severe disabilities.

The past 11 years I have seen very little or no mobility at all offered to the group of multihandicapped children. I'll start to introduce the group of children. In the classes I teach, there are 12 children 8-16 years of age. 3 of them have low vision, 9 totally blind. 9 boys and 3 girls.1 blind boy in a wheelchair. They have no active communication. The group is divided into 2 groups.

Four years ago a new project started. One group (6 children) met twice a week in order to improve their understanding of communication. The project "Language and Movement" had elements of mobility integrated in the project. In short, the children put word on what they did. Like: Walk, turn right, left and so on. Some of them are able to be navigated around and don't need a sighted guide, which is very useful for people around the child, and the child is independent to some extend.

- But- is it possible to transfer strategies learned in a classroom- out into the real world, and yet close to the child's environment?
- Is it possible to establish further independence, which give the children opportunities to move about freely, independently and goal-orientated?

Having thought about that for a long time, the idea about a playground turned up. Of course it had to be right outside the buildings.

Considering how to design a playground, superior goals had to be fulfilled:

- activity
- independence

- goal-orientated
- safety
- simple construction

As we are dealing with a group of children with very low developmental level, it is necessary to think "simple". It doesn't make it easier, on the contrary, we need to know each individual child very closely before a program can get started. Much mobility is either given up or even wasted, as we tend to get too ambitious, and the children are not able to fulfill our demands.

Demands and criteria for designing a playground theoretically.
Knowing about the senses and how to use them in relation to orientation and mobility is a must.

- balance / vestibular sense
- tactile
- hearing
- sight
- smell
- taste
- kinestetic sense

Directions and communication
How to respond to language
Right-left-straight on-under-over-through
Body-awareness
Mental mapping
Make a simple and logical structure in the physical design which gives a perceptual understanding of how and where to move.
Challenge
Develop motor skills
Experiment and find out how to manipulate the surroundings

Designing a playground would be very easy if I got hold of a catalogue and ordered a complete standard playground. I could never accept this for 2 important reasons:
1. Theoretically I can't put the children into a standard where no considerations have been made according to the above mentioned criteria for designing a playground.
2. Unrealistic seen from an economical angle (too expensive)

Demands and criteria for designing a playground physically
Description of the environments:
The pupils go to school in a small building divided into four classrooms. At each end of the building there is a door out to an area (20 meters X 9 meters). This "yard" is closed completely with a fence. The area used to have beautiful roses under the windows, grass and a bench to sit on. Not really any need to learn how to get about. If they did, they could get bruises from the roses. So what I did before anything else was to move away the roses.

Building this playground had not been possible without help from helpful colleagues. Also some of the V.I. children have been working with this project for a period of time. The children found it very meaningful, and were happy to see that the results from their work actually could be used by another group of V.I. children. Financially, it was a lot easier to get materials from the account: ”Teaching materials“.

The philosophy behind this playground is the idea of its constantly changeable design. I also like the idea of recycling: if we at the same time think of the milieu and make pleasant and nice environments for V.I. children, we have considered both parts. Observations of the children will tell us when and how to reconstruct activities according to the individual child's actual level of development. Therefore I am happy to say that this playground hasn't finished. Development never stops, and like V.I. children we all have a need to meet new challenges in life. Challenges here defined and described by activities in relation to mobility.

Road system:
- simple / logical structure
- straight angle
- restricted area
- rechangeable
- tactile

Parallel bars:
The bar is 16 meters long and the width is 90 cm. (same as rubber mat). It has railings on both sides. Main goal was to give children in wheelchair an opportunity to walk independently from door to door, and hopefully go on through the system using an alternative mobile device.

Children who can walk, but not alone, get a chance to walk alone with help from the railings. For the sake of the children who have just started walking, there is made a ”middle-board”, making it possible to get up on your feet again by yourself. The parallel bars turned out to be excellent when introducing the cane. Two boards were placed at the bottom at both sides in a distance of 90 cm. The bottom boards give the child an auditiv feedback whenever the cane touched the boards. Learning how to walk in a straight line can be difficult to understand -and do- here is the chance to practice how to walk straight on.

The stairs:
Most multihandicapped children have problems on stairs. Often they live in institutions with no stairs. Like other children they don't run up and down just for the fun of it, and their motor skills is not developed. Co-ordination, balance and low tonus problems are reasons why I made this special construction, which makes it possible for this group to walk on stairs safely, independently and have fun. The size of the stairs is 100 cm width, and length of 270 cm. It has railings both sides, so when walking it's possible to keep the balance. Two steps up -a landing- two steps down. A board is put between the steps to prevent the foot to “falling down”. The steps are wide enough to walk at.

Surprisingly the children started acting like children meeting stairs for the first time in their lives. Experimenting up and down over and over, and while the children were playing they

were learning! My theory is that if we construct appropriate environments, the children will use them, and develop. Some children had to be motivated through other senses, such as sounds, a funny thing to touch, to smell, or something to eat.

House of senses:

Having climbed the stairs, and following the rubber mat further on, the child will meet a door and walk into "The House of Senses". Walk straight ahead and you meet another door, and walk out again. But if the child chooses to do some experimental studies, he can, by use of his senses find out what's in this house. The house is made of wood, and on one of the sides are two windows. Two different marks at each door tell which way to go, and doing so, we have helped the child to choose in which direction to go, make a decision and act accordingly.

Swing:

Most children enjoy being active in a swing. Only, I want them to find it for themselves. I found all the materials at a dump and with some help got it restored. Notice the surface underneath the swing. The tiles are soft and tactile good for two reasons: They don't get hurt from a fall and they will always know how to find the swing.

The Labyrinth:

In order to learn directions a construction with an angle of 90∞ was being made out of wooden materials. Again it is possible to change if necessary.

Soundwall:

A wall made of wood: Height 2,50 meters, Width 1,20 meters.

The activity has two purposes: One is to make a sound and make the child follow that direction. Secondly I want the child to be self-active. Through the holes a rope is put, and on the other side of the wall interesting objects are put! These objects must have different qualities. Different sounds and weight. Actually the child can use both hands and start comparing. The idea is to make the child use his hearing and learn about different sounds so important when learning mobility. This is a "middle-step" as I believe that the child has to learn to listen by making own sounds before he can transfer it into the real life. Another aspect: The child gets muscles, strengthens his finger muscles and maybe one day he is able to hold a cane in his hand.

Results:

This presentation is followed by a video from Spring 1998

-How the playground is used for mobility training

-How the children actually use it on their own

-Do the pupils get an understanding of how to use the tactile surface?

-Do the children walk goal-orientated because they want a specific activity?

-Are they able to find it?

-Are the activities challenging enough?

-Has the balance improved?

-What about "Quality of Life"?

-Are the children happy?

I CAN SEE, BUT I STILL CAN`T FIND MY WAY HOME

Orientation and mobility for children with cortical visual impairment (CVI)

Inga-Stina Fellers and Åsa Karlsson Lundqvist
Tomteboda Resource Centre
Solna, Sweden

At Tomteboda Resource Centre, TRC, children with low vision come for examinations which include a total evaluation of the child from medical, optical, pedagogical and psychological point of view.

When we are testing the visual functions, in children with cortical visual impairment, CVI, we have observed that some of the children have a varying visual behaviour. Sometimes they are sighted and sometimes not. Some of these children have difficulties with their orientation, both in familiar and unfamiliar surroundings. They often feel insecure, wish to hold a parent's hand and can not find their way around.

This problem is hard to discover early in the childhood when the children are close to their parents or other adults. The difficulties with orientation become more obvious when the child gets older and wants to be more independent.

In this presentation we will focus on how to assess these children and how to give them pedagogical advice regarding orientation and mobility.

We have studied some of the children in their familiar environments. With some short videos we will now illustrate their difficulties with orientation and which strategies they use.

ORIENTATION AND MOBILITY FOR ALTERNATIVELY MOBILE INDIVIDUALS

SANDRA STIRNWEIS, MA, COMS
Foundation for Blind Children
1235 E. Harmont
Phoenix, AZ 85020 USA
SandraSt@JUNO.com

The field of Orientation and Mobility is ever expanding. As it expands it is important that professionals in the field expand their knowledge to properly teach this very diverse population. One of the more rapidly growing groups is those who are "alternatively mobile". These individuals may use a support cane or two, a walker or a wheelchair. They may also move under their own power but through rolling scooting or crawling. They may be low vision travelers or blind travelers. There are many techniques available to the Orientation and Mobility Specialist who has one or more of these clients on their caseload.

This alternatively mobile population does not often receive orientation and mobility instruction because it is assumed that the physical therapist will teach these skills. Unfortunately, the role of the physical therapist often ends as soon as the person is capable of maneuvering in the device. With multiply impaired individuals mastery of their device is sometimes not even expected. 'E' is one such example.

'E' has severe Cerebral Palsy. She is in an electric wheelchair but does not wheel herself independently. She is visually impaired but demonstrates good use of visual skills. Her mother feels she could use her chair effectively if given instruction. She has extremely limited use of the left hand and somewhat limited use of the right. An Orientation and Mobility evaluation was set up. Because 'E' has multiple impairments her abilities were discussed with both the Physical Therapist and the Occupational Therapist. Both felt she did not have the ability to independently move her chair for behavioral reasons. They explained that she simply turned in circles when given an opportunity to use her chair. 'E' was brought outside and told that she could push the chair herself but that she must follow all directions given. If she did not she would be pushed back to class. It was immediately apparent why she was turning circles. The natural extension of her right arm to the joystick was to the right. It was also difficult for her to grasp the small stick. However, she seriously attempted to keep the chair on the sidewalk and tried to avoid obstacles. She had better head posture than usual and used her vision well.

Although the therapy staff was not convinced of her abilities they did help me to adjust her chair and joystick to increase her performance potential. The Physical Therapist made sure she was fully stretched before using the chair. The Occupational Therapist made an adaptive joystick that provided her with a better grip. Adjustments were made in the placement of the joystick to maximize her abilities and limit her over extension to the right. 'E' was highly motivated to be an independent traveler.

In less than one semester (15 weeks) 'E' is more than 80% independent in traveling the three-turn route from her classroom to the bus. Her mother cried when she saw her daughter's abilities. 'E' is doing better in school and is motivated to learn in many areas. However, without the intervention of orientation and mobility she might still be sitting, waiting for someone to push her.

'E' is a child who can visually navigate her environment. However, the child who does not have usable vision still needs the opportunity to try to travel independently as well. Many adaptations can be made to a wheelchair to provide tactile information. Curb feelers are on the more commonly used. If the person is pushing their own chair or does not have use of both arms adapted canes can be mounted to the chair to provide environmental information. One mounted on the left side facing forward will tell of information straight ahead. One mounted on the right side to trail will indicate when walls have ended. A protective swing arm can be mounted across the leg rests to protect the traveler from suddenly opening doors. Combinations of different tips to provide different sounds on different sides can be used to increase discrimination of information. Electronic Travel Aids can be extremely useful in understanding the larger world and planning clear routes of travel.

If you are being asked to provide service, determining when the child who is alternatively mobile needs direct orientation and mobility instruction can be a little more difficult. To assist in this determination a checklist of necessary skills was developed. It examines sixteen movement skills and evaluates the amount of assistance, from total to independent, needed to accomplish this movement task. At each level of assist the orientation and mobility specialist can come into the classroom setting and transition the teaching model from observation to consultation to direct instruction. The first skill on the checklist is rolling. When a child can roll over independently they can be taught to roll to an objective. This movement may transition to a higher level of movement. However, if it does not the child can still be taught to move independently, at least for some skills, with the independent form of movement they have.

If a child has a walker determining when they need direct instruction is made easier through use of the list. The necessary prerequisite skills are pulling to stand in the walker, supporting their own weight in the walker, and propelling the walker. If a child can only propel the walker with total assist direct instruction is not warranted. However, if they can propel the walker with minimal assist direct instruction becomes more realistic.

Once the child is moving in the walker determination of how they use their residual vision is a critical component. Perhaps they can see the light fixtures on the ceiling and use them to determine when they are in a hallway intersection. If there is no useable vision adaptations may have to be made to the walker to increase the child's safety and provide environmental information. Many of the adaptations for the wheelchair can be applied to the walker. Discussion with the Physical Therapist as to the type of walker needed may allow for one that will provide more forward facing protection. However, the child cannot automatically be placed in this type of walker if it does not provide the appropriate physical support needed. Often the child will use the wheel or edge of the walker as a curb feeler. However, this impedes smooth

movement of the device. The person is better off with a curb feeler or adapted cane to provide trailing information.

For people using two support canes, adaptations can be a little more challenging. The person should not use their supports as information seekers. If the support cane were to encounter a drop off, for example, the person would already be off balance and could fall. Depending on how the person uses their support canes an information seeking cane can be mounted to one of the support canes. By fixing it to the support cane with a flexible hinge it may be possible for the person to move the support cane in such a way that the information cane springs up and taps down when the support cane is brought down. This will provide auditory feedback. When the feedback was absent a drop off would be indicated. The user could then shift their balance and ready themselves to explore the drop off without falling. This type of adaptation is very individualized and may not work for every traveler. ETAs are also good options for this group of travelers.

When working with alternatively mobile individuals the term “independent” takes on new meaning. Many lay people will think that if the person is not going to go to work or from class to class by themselves they have no need for instruction. However, there are various levels of independence and each provides respect for the traveler. The first is assisted independence. In this instance the individual moves through space under their own power as much as possible. Assistance is offered as needed but the traveler feels they are in charge of their movement. Supervised independence is the next level. The person can travel under their own power but is not always safe, either due to environment, skills, or behavior. Again, the person travels as much as they can on their own, building self esteem fitness, and a better organizational picture of their environment. Independence is traveling under their own power with no supervision necessary. An alternatively mobile individual may use each of these types of independence. They may have assisted independence in getting to the job site or class. Once there they may have supervised independence to travel within that environment. At home they may be completely independent in their travel. Each of these is a legitimate form of independence that should not be denied.

When determining who does and who does not need the instruction of an orientation and mobility specialist it is important that the use of the long cane not be the first consideration. If the person is able to move through their environment under any means we have the obligation to teach them how to do that with as much safety as possible. The therapists who normally work with this population will be valuable resources if brought into the process and made a part of the team. This type of instruction is often done on a consultation basis. However, as the person needs less and less assistance to travel the model of service needs to transition to direct service. The person may have several levels of independence. Only the orientation and mobility specialist has the expertise in visual impairment and functional travel skills to provide the instruction necessary for the alternatively mobile person to be as independent as possible.

MOBILITY AND CANE USE AS A MEANS OF COPING WITH VISUAL IMPAIRMENT

GERLINDE BELLEFROID
Low Vision Rehabilitation Centre
Ophthalmology Department
University Hospital
Kapucijnenvoer 33
3000 Leuven, Belgium

Loosing sight in a certain degree results in serious consequences for professional and social life, in difficulties with communication and mobility independence, often in major acceptance problems. One becomes a person with an impairment.

As part of the rehabilitation program, the low vision ophthalmologist sends the (newly) visually impaired for a first mobility interview. For people with a visual acuity of +/- 20/200 or a visual field of +/- 10∞ or less I soon advise the use of a symbol or long cane as part of a mobility training.

Purpose:
In this paper I analyse whether the use of a cane can help clients with severe sight loss, to cope with their visual impairment.

Subjects and methods:
During the last 5 years 174 visually impaired clients came for a first mobility interview. Their age varied from 8 to 80 years old. According to the degree of sightloss I divided the group into 6 categories (V.A. 40/200 - 20/200 ; V.A. < 20/200 ; V.A. <10/200 ; V.F. 10∞ and less ; V.F. 5∞ and less ; blind).According to the age, the group is divided into 7 categories (10 years each). For combined eye conditions the most severe loss is encountered. Most clients had no additional handicaps.

Whether a cane is advised or not, which cane and which type of mobility training depends on the degree of sight loss, the age and the need of the client, the difficulties with safe and independent travel. The advise to use a cane and the possibility of mobility training is given after the interviews; the client decides himself if and when he/she wants to try and start a training. The length of training again is very variable. After functional low vision assessment one of the following types of canes may be advised:

- Support cane: usually for elderly partially sighted clients or people with balance problems; is only advised when no protection techniques are required;
- Symbol cane: for any age, when clients have enough residual vision to detect obstacles or steps, when clients are uncertain or have fear at crossings; when clients experience discomprehension from other pedestrians, cyclists or with use of public transport;

- Long cane: for any age; when protection techniques are required in some or all situations; for clients with visual field loss and/or with degenerative eye conditions.

A lot of attention within mobility training is given to the functional use of residual vision. Light filters and/or monoculars may be needed in combination with a cane. Every mobility training is very individually orientated. Once training starts people come on a weekly base. Every session lasts for 1 hour; towards the end of training sessions are longer. For each individual a lot of time is given to the psychological aspects of loosing sight, to the expressions of different feelings coming along with cane use. Progress in training is very much depending on acceptance of cane need. Learning the new skills is only part of the training. The partially sighted client learns when he or she can use the cane and which technique is most suitable for a certain situation. After training the partially sighted person decides himself when or where to use the cane.

Study:
In the total group of 174 subjects, no cane was advised for 22 of them (13%) - (Fig.1)
- 6% (10 subjects) had a V.A. between 40/200 and 20/200
- 7% (12 subjects) had a V.A. of <20/200
- Most were younger than 25.

For 87% of the total group the use of a cane was advised (152 subjects).
This group of 152 subjects is divided according to:
- type of cane which was advised
- degree of sightloss
- age

whether or not a mobility training was started and succeeded

The following percentages concern this group of 152 subjects: (Fig.2)
To 44 % (67 subjects) a symbol cane was advised; 13 % (20 subjects) refused the advise and didn't start to use a cane; 31 % (47 subjects) accepted the advise and followed a mobility training.
From the 13% (20 subjects) who refused a cane:
- 9% (14 subjects) had a V.A. <20/200
- 4% (6 subjects) had a V.A. <10/200.
- 12% (18 subjects) of those who refused was older then 45.

From the 31% (47subjects) who started training with symbol cane:
- 5% (7 subjects) had a V.A. 40/200 - 20/200
- 15 % (23 subjects) had a V.A.<20/200
- 9% (14 subjects) had a V.A. <10/200
- 2% (3 subjects) had a fieldloss of <10¡
- 2 Subjects gave up (1,3%)
- The main group was older then 65.

To 56 % (85 subjects) a long cane was advised. 11% (17 subjects) Refused the advise and didn't start to use a cane.

45% (68 subjects) Accepted the advise and started training.
From the 11% (17 subjects) who refused a cane:

- 4 subjects (2,6%) had a V.A.<20/200
- 7 subjects (4,6%) had a V.A.<10/200
- 5 subjects (3,2%) had a visual field loss of <10∞
- 1 subject (0,6%) had a V.F. of <5∞
- 13 of the 17 subjects who refused a cane were older then 35.

From the 45% (68 subjects) who started mobility training with long cane:

- 7% (9 subjects) had a V.A. of 20/200 and less
- 17% (26 Subjects) had a V.A. of <10/200
- 13% (19 Subjects) had a field loss of 10∞ or less
- 5% (8 subjects) had a V.F.of 5∞ and less.

Only 3% (5 subjects) of the total group of 152, to whom a cane was advised, were totally blind. They all accomplished a long cane training; 2 of them were blind from birth.

<u>According to the degree of sight loss:</u> (Fig.3)

- V.A. 40/200 - 20/200 (18 subjects)
  - for 10 subjects the use of a cane was not advised
  - for 7 subjects the use of a symbol cane was advised
  - for 1 subject the use of a long cane was advised
- V.A. 20/200 and less (62 subjects)
  - for 12 subjects the use of a cane was not advised
  - for 50 subjects the use of a cane was advised and 32 actually followed a training:
    + 17 with symbol cane
    + 4 with symbol cane and monocular telescope
    + 4 with support cane
    + 9 with long cane
  - 2 of the 32 starters gave up training
- V.A. 10/200 and less (53 subjects)
  - for all subjects cane use was advised
  - 13 refused; 40 actually followed a training:
    + 13 with symbol cane
    + 1 with symbol cane and monocular telescope
    + 2 with support cane
    + 21 with long cane
    + 3 already had a long cane but techniques were corrected
  - 3 of the 40 subjects gave up training
- V.A. 10∞ and less (25 subjects)
  - for all subjects cane use was advised
  - 5 refused; 20 followed a training:
    + 1 with symbol cane
    + 19 with long cane
  - no one gave up training

- V.A. 5∞ and less (11 subjects)
  - for all subjects cane use was advised
  - 1 refused; 10 started training:
    - + 2 with support cane
    - + 8 with long cane
  - no one gave up training
- Blind (5 subjects)
  - for all 5 long cane was advised and training completed
  - 1 subject uses a guide dog now

<u>According to the age:</u> (Fig.4)

- Born before 1930: to 27 subjects cane use was advised
  - 11 refused
  - 16 use a cane (14 a symbol cane; 2 a long cane)
- Born between 1930 - 1940: to 25 subjects cane use was advised
  - 8 refused
  - 17 use a cane (7 symbol cane; 10 long cane; 1 gave up)
- Born between 1940 - 1950: to 30 subjects cane use was advised
  - 8 refused
  - 22 use a cane (6 symbol cane; 16 long cane; 1 gave up)
- Born between 1950 - 1960: to 23 subjects cane use was advised
  - 4 refused
  - 19 use a cane (9 symbol cane; 10 long cane; 1 gave up)
- Born between 1960 - 1970: to 15 subjects cane use was advised
  - 2 refused
  - 13 use a cane (all long cane; 1 gave up)
- Born between 1970 - 1980: to 23 subjects cane use was advised
  - 3 refused
  - 20 use a cane (8 symbol cane; 12 long cane; 1 gave up)
- Born between 1980 - 1990: to 9 subjects cane use was advised
  - 1 refused
  - 8 use a cane (3 symbol cane; 5 long cane)

<u>Observations:</u>

For almost all visually impaired clients the decision to start a mobility training is very difficult. The idea that a white cane is only for the blind brings along a lot of negative feelings. There are serious consequences and impacts due to the attitudes of others towards a white cane. Starting to work with a cane might give a conflict with the self-esteem and self-concept. There is fear for loosing sight completely. The partially sighted person doesn't want to be seen as a blind person. To start a mobility training is a confrontation with the sight loss, with the visual handicap, with all the practical, social and emotional problems around it. It is a confrontation of one's handicap with the outside world. A lot of partially sighted people have given up independent travel in difficult situations because it is easier to avoid confrontation with problem and frustrating situations. During the mobility training the protection techniques and different

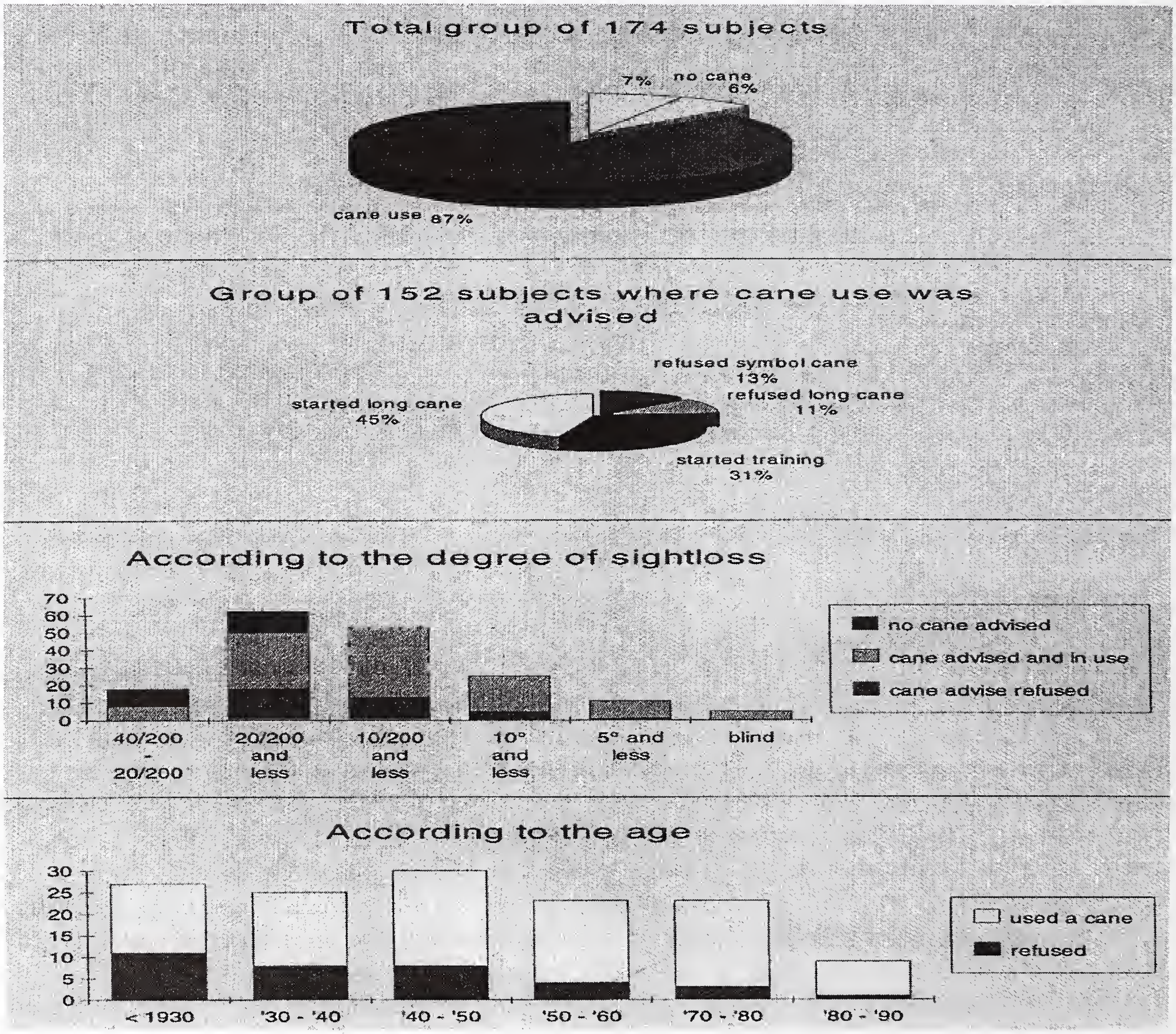
skills can help to regain confidence. Belief and confidence in those techniques can give a more positive idea on the use of a white cane.

Conclusions:

Over 5 years time the use of cane was advised to 152 subjects; 74% completed successfully a mobility training. This group of people almost all had a good amount of residual vision and started the training with the idea of not needing a cane yet. From the 24% (37 subjects) who refused to use a cane, 17 % (27 subjects) were older then 45. Only 5 subjects gave up training.

Once people decided to start a mobility training, the type of cane and techniques were of no significant concern. For a successful mobility training the O&M Instructor needs to have good knowledge and understanding of the different theories of loss and grief, of counseling, of the impact of fear, anxiety and stress in travel situations. The O&M instructor has to be competent to make respectful and correct judgments on the clients psychological readiness for the different levels of independent travel. And very important is the trusty and positive relationship between the mobility instructor and the client in this process of trying to live with the sightloss.

I can conclude that most partially sighted people have a benefit of the use of a cane, whether it is a symbol cane or a long cane. And that the mobility instructor has a serious responsibility; Not only to train a visually impaired person to travel safe and independent but also to help rebuild one's confidence and belief in personal capabilities.



MUSCULOSKELETAL AND PSYCHOSOCIAL ISSUES ASSOCIATED WITH TRAVEL AID USE

JULIE MOUNT, PHD, PT
PAUL HOWARD, PHD, PT
Department of Physical Therapy

LAURA GITLIN, PHD
Community and Homecare Research Division
Thomas Jefferson University
Philadelphia, Pennsylvania

The use of a long cane or a dog guide involves prolonged muscle contractions, sustained stressful postures, and repetitive joint movements that put users at risk for musculoskeletal dysfunction resulting in pain. One of the roles of physical therapy is to treat people with pain or dysfunction due to musculoskeletal problems, and to teach people strategies for avoiding pain syndromes. The authors of this study were unable to find any literature describing musculoskeletal problems and pain syndromes associated with the use of canes and dog guides, although there are a few studies that address musculoskeletal problems of people who are blind (Scranton, Clark & McClosky, 1978; Siegle & Turner, 1965; Turner and Siegel, 1969). The purpose of this study was to explore the perceptions of people who use dog guides and canes regarding the physical discomforts related to using travel aids.

Methods

A focus group method was chosen, because it is particularly appropriate for exploring a topic on which there is little information. Focus groups are discussions among a group of people who share a common experience, guided by a trained facilitator. Focus groups provide in-depth insight into the experiences and perceptions of the participants, and the extent to which these perceptions are shared with others. While the comments of the members of the focus group may or may not be representative of the larger community of blind individuals using travel aids, the insights can be used to generate hypotheses and guide future research.

Subjects for this study were adults who are blind or severely visually impaired and who travel independently in the community using either a cane or a dog. Participants were recruited by sending invitations to organizations serving the blind and through an announcement over Radio for the Blind. Twenty one individuals, ages 27 through 68 (mean 51) participated in the study, 11 males and 10 females. Twelve participants used canes, and 9 used dogs; of those who used dogs, all but one had previous experience using a cane. Thirteen participants had used a travel aid for 20 years or more, 4 for 10 to 19 years, and 4 for 1 to 5 years.

Subjects were randomly divided into two groups, and each group met for 3 sessions. During the first session, general information was gathered about how each individual came to be blind, and their experience choosing and learning to use their travel aid. General questions

were asked about whether the individuals experienced any physical problems related to using their travel aid. The subsequent two sessions involved following up issues that were raised by participants in previous sessions.

Three aspects of focus group methods were used to ensure the credibility of the data: reaching the point of saturation, multiple data coders, and a member check. Three sessions were used for each of two groups of participants so that saturation could be achieved. By the last session, the investigators were able to anticipate the responses of the participants. The multiple coders were three of the researchers who independently reviewed the transcripts and grouped responses into categories and themes. The three coders then met together to reach a consensus on the recurrent themes and to agree on a coding scheme. The member check was accomplished by having one of the participants serve as an informant. The researchers shared their insights and interpretations with the informant who provided feedback and suggestions from the point of view of someone who shared the same experience as the participants.

Results

During the initial session there was a tendency among the participants to downplay or deny any physical problems associated with using travel aids, and to emphasize the benefits of using travel aids. Social benefits include increased ability to get around independently, resulting in increased social engagement and increased ability to participate in work and leisure activities. Psychological benefits include decreased anxiety, increased safety from physical harm, and improved self-esteem. Biophysical benefits include increased aerobic fitness, increased strength and endurance, and the ability to get around more quickly.

For the participants in this study, the benefits of using travel aids outweighed any physical problems related to travel aid use. One participant was explicit in his concern that if too many physical problems were revealed, access to travel aids might be restricted:

> I hope that [this research] does not indicate that cane and dog travel should be deferred because it causes pain in the arm or it causes you to slouch.

A couple of participants reported a symptom that could have been related to using a travel aid, but insisted on attributing it to age. One dog user denied having had any back pain, but his wife described him as having a significant episode of back pain:

> My husband hurt his back when he was using a dog who had a very strong pull, and he had to not use the dog for about six weeks. He just couldn't use it. He had to use a cane.

Participants reported that if they had any aches or pains while traveling, that they could not afford to be distracted by them. Using travel aids requires careful attention to and processing of a variety of tactile and auditory environmental cues. One participant described an episode in which being distracted from these cues almost resulted in a life threatening event.

By the end of the third session, participants had described a wide range of physical problems that they associated with traveling with a dog or a cane. We will describe here only those musculoskeletal problems that the participants themselves attributed to using the travel aid. The problems will be organized according to whether they occurred only among dog users, only among cane users, or among both dog and cane users.

One physical advantage of using a dog is that it is possible to walk faster with a dog than with a cane. This enables the dog user to increase his/her level of aerobic fitness. However, walking faster also increases impact forces on the heel, and one dog user reported developing painful heel spurs. Walking faster also increases the stress to the muscles that attach to the shins. Another dog user reported that he developed shin splints within a week of starting to use a dog. A number of participants identified physical problems related to the dog pulling too hard. These problems included wrist tendonitis, ganglion cysts in the wrist, shoulder pain, shoulder subluxation, back pain, and falls resulting in multiple aches and pains. Asymmetrical posture, with a sagging left shoulder, was also identified as a common problem for dog users. A sagging shoulder posture can cause back or shoulder pain.

Cane users described being stabbed by the cane when the cane tip got caught in a crack in the sidewalk. They also reported fatigue and soreness of the wrist muscles when they were first learning to use the cane, and carpal tunnel syndrome after long term cane use. Carpal tunnel syndrome is a fairly common problem among people who perform repetitive movements with their wrist. The symptoms are pain, numbness and or tingling in the hands. Some cane users attributed their slouched postures to reaching forward with the cane. A slouched posture can cause back pain.

Both cane and dog users described back pain that they attributed to a rigid posture and muscular tension resulting from anxiety during travel. Another common problem was arm and back pain caused by always having to carry heavy loads with the arm that was not using the travel aid. Most people shift heavy loads from one arm to the other to relieve muscle tension and stress to joints. People who use travel aids always have one arm occupied, so they do not have the ability to shift heavy loads back and forth.

Recommendations for Decreasing Discomfort Associated with Travel Aid Use

We recommend three different types of strategies be considered for easing the discomforts that participants attributed to travel aid use. These three types of intervention strategies are education, exercise, and technology.

People who use travel aids can be taught relaxation techniques and the importance of good postural alignment. Cane users can be taught strategies that minimize musculoskeletal stresses, including taking periodic rest breaks or alternating which hand the cane is in. Perhaps dogs could be trained to reduce their speed on voice command, and dog users can learn to switch the dog from one side to the other periodically.

Exercises could also be used to minimize the occurrence of discomfort, especially if the individual experiences a period of relative inactivity prior to using a cane or dog. Both dog and cane users would benefit from postural and relaxation exercises and exercises for the back, shoulder and wrist. Dog users might benefit from ankle exercises to prevent shin splints. During periods of immobility, people with visual impairment could maintain their cardiopulmonary fitness by engaging in an aerobic exercise program, perhaps using a stationary bike, treadmill or rowing machine.

Improvements in technology may also help reduce the incidence of discomfort among travel aid users. Simple technology such as shock absorbent shoes for dog users might prevent heel and shin pain. Carrying loads equally distributed across the shoulders in a backpack will reduce the arm and back pain associated with carrying loads in one arm. Careful adjustment of the cane and harness lengths will assist in preventing some shoulder and back problems. Cane tips that do not get stuck in sidewalk cracks will prevent some stabbing. Perhaps dog harnesses could be designed to dissipate sudden accelerations by the dog, and thereby prevent some wrist, shoulder and back injuries.

Conclusions and Recommendations for Further Research

Despite the tendency for people who use canes and dogs to minimize the physical discomforts related to travel aid use, a substantial number of physical problems were revealed in focus groups with people who are visually impaired. Research is needed to determine whether the problems revealed in these focus groups represent the full range of musculoskeletal problems, and to determine the prevalence of each problem. Research demonstrating whether particular cane manipulation strategies are associated with specific musculoskeletal problems would enable O & M trainers and physical therapists to advise cane users regarding which strategies minimize musculoskeletal stress. Much remains to be known about the relationship between travel aid use and musculoskeletal discomfort.

USING THE RAINBOW TECHNIQUE-THE EFFECTIVE APPLICATION OF RESEARCH FINDINGS IN SPECIFYING COLOUR AND LUMINANCE CONTRAST

YVONNE HOWARD

Joint Mobility Unit, Royal National Institute for the Blind & The Guide Dogs for the Blind Association. 224 Great Portland Street London W1N 6AA.UK

The intention of this paper is, fundamentally to demonstrate how the findings from academic research may be used to bring about improvements to the built environment that may enhance the potential for individual autonomy for visually impaired people.

Project Rainbow, a two year research project, was described at the 8th International Mobility Conference (1). The primary aim of the research was to produce a design guide to determine adequate, colour and luminance contrast that may be applied to building interiors. The resultant contrast should assist visually impaired users in tasks of search, navigation and identifying objects, therefore, enhancing the utilisation of buildings by visually impaired and sighted users.

The 8th May 1997, marked the Launch of the aspired product, " **A design guide for the use of colour and contrast to improve the built environment for visually impaired people"** (2). The document, which will be referred to in this paper as the design guide, has been publicised in popular journals within the UK, and the research findings have been disseminated through conferences, written articles, and seminars to designers , with the intention of promoting the successful application of colour and luminance contrast throughout Europe and beyond.

During the research, the project determined three important factors, that provide the fundamental design principles within the design guide. The first principle is based upon the findings of colour contrast perception tests, which recorded the response of visually impaired and sighted people to approximately 11,00 pairs of colour combinations. Partially sighted people cannot only perceive subtle colour differences, but can also describe and name colours in a similar manner to 'fully' sighted people, and therefore, may be able to use colour and luminance contrast as a navigational tool and as a means of enjoying spatial ambience and design aesthetics. The implications of these findings are expressed within the technique of achieving colour and luminance contrast illustrated within the guide. The technique gives the designer the tool that establishes quantifiable colour and luminance contrast between building surfaces, in a manner that is compatible with methods currently used by designers when creating colour schemes for those who are 'fully' sighted.

The second principle is established from the information gained from 700 questionnaires and establishes that contrast should be applied to critical, adjacent surfaces of key building elements and components. These surfaces are related to floors, walls, ceilings, and doors. Other

building features and objects have also been highlighted as areas where colour and luminance contrast should be considered.

Finally, the third principle which the research determined, is related to the attributes of colour which are a necessary component in providing a contrast between two adjacent colours. Colour contrast perception tests identified the contrast thresholds for a varied visually impaired group. These thresholds determined contrast tables within the design guide, that provide the attributes of specific colours which, when used adjacently, provide an adequate contrast. These attributes relate to the hue, chroma, tone, and the light reflectance value of each colour sample, with a choice of over 1,600 colours.

Aspects of the research methodology and the findings have been interpolated to produce the final design guide document and the technique has been, or is in the process of being applied within the colour schemes of various buildings. Certain issues have been highlighted concerning the procedure for applying the technique and, the logistics of planning and programming the use of the technique into the building process. These topics require further exploration.

Those who disseminate the research findings and the application of the technique, face the task of reinforcing the idea that the specifier still creates the colour scheme, and the technique, with the subsequent colour tables provides a scheme that gives adequate colour and luminance contrast to assist all building users. Colour schemes are achieved using monochromatic, harmonies and contrasts colour combinations. These methods rely upon choosing colour combinations that have a particular spatial relationship within a three dimensional system for grouping and categorising colours. Applying the technique by randomly choosing colours requires further knowledge upon colour theory and science. The technique has, therefore, been suggested as being prescriptive by reducing designers' creative abilities, especially for those who choose not to apply these established methods. The issue clearly illustrates the subjective nature of colour coordination and schematics.

Specifiers also need to simultaneously consider the aspect of achieving a desired lighting level while using the technique to create a desired scheme. Surfaces such as walls and ceilings have an influence upon the overall light quality of a space (3) . In large rooms the contribution of light reflected from the ceiling to the total light (illuminance) upon surfaces where certain tasks are performed is usually substantial. Therefore, light reflectance values for ceiling finishes in large areas should be of a high value. In small rooms the wall reflectance becomes a critical issue. High wall reflectances will enhance the illuminance upon the working surface and also increases the uniformity of the light distributed. Designers may, therefore, choose to specify wall colours with a high reflectance value and this decision inherently limits the choice of colours that may provide a contrast with the ceiling, where, high reflectance values may also be desired.

The issue may be illustrated in a building, (the Guide Dogs for the Blind Training Centre, Cardiff) which adopts the technique. The contrast between the ceiling and the walls within corridors without any natural daylight, are insufficient due to the similarities of the light reflectance

values, which show a difference of less than 30%. Further guidance evolved from the research (4) suggest that ceilings are termed a critical surfaces as they provide useful information about spatial dimensions and spatial quality. Therefore, the area is not used as the main surface for search and navigational tasks and the criterion for choosing the colour scheme was based upon a desire to use finishes with the highest potential of reflecting light onto key objects and surfaces that are used in the task of navigation, locating and identifying objects.

Specifying colours to be used in buildings is also dependent upon the method in which colours are categorised into a system. Colour order systems are utilised in industry to arrange colour perception in coherent manner by systematising the visual stimuli producing the perceived colour, and by giving specific measurements for mixing pigments and dyes. There are over 10 systems for categorising and naming more than 1,600 colours. The design guide uses the Dulux colour dimension system for specifying colours within the colour contrast tables. This system applies to the manufacturing and production of paints, wood stains and varnishes. Manufacturers of different materials use a variety of systems, some of which may be unique to their particular product, which raises the issue of consistency. The subject is compounded further when consideration is given to the knowledge of designers and specifiers, which may be limited to specific ordering systems. Hence, the readings taken from the design guide may need to be translated into the system which is used by the manufacturer of a particular and desired product and also needs to be understood by the user.

The selection method is based upon using one surface colour against another. However, many finishes such as carpets are composed of more than one colour. In this instance the specifier is faced with the task of choosing the most influential colour as the base colour, in which to work out an adequate scheme. Hence the question often posed relates to how the most influential colour is determined. In many cases this has been attributed to the colour which occupies the greatest surface area on the finish. However, the decision may also be dependent upon the colour which is perceptually prominent due to its level of intensity or lightness. In these cases the designer has to rely upon a level of self judgment.

The final point raised within the implementation of the research findings is related to the logistics of programming and planning the concept within the overall construction process and the influence of the process upon the overall concept of inclusive design. The Royal Institute of British Architects categorises the building process into particular phases where certain tasks are undertaken by both the client and the designer. A key stage is that of inception when the client has the ability to brief the designer of their requirements by establishing particular design principles and policies. These principles may include all aspects of inclusive design. During the scheme development and detail design stage, designers and consultants have the ability to strategically incorporate these principles. This ensures that the design should meet certain requirements from its initial development. Further stages consist of the development of detailed information and specifications relating to the materials to be used within the design, which may also include naming specific colours determined from using the technique within the design guide. Designers wishing to specify particular colour combinations may should consider writing these requirements into the detailed specification so that they become

a legal requirement for contractors to implement. Particular project managers on large scale projects such as, Blue Water, Kent (proposed to become the largest retail park in Europe) have raised the issue of colour contrast within various stages of the design and construction process, which has encouraged further considerations to ensure that finishes providing a contrast are also of a low sheen, and are warm to touch, within interiors lit under recommended lighting levels. Hence the qualitative and quantitative nature of inclusive design issues may be considered in parallel.

The design guide has been received with great enthusiasm and has generated may queries. Designers are keen to implement the principles but seek further knowledge of the strategies people adopt when navigating buildings. Hence, it has wetted the appetite of those who desire to enhance their knowledge of visual perception and colour discrimination and hence, the guide has achieved more than was envisaged by the research team. Its finding will now be tested within transport interiors and further investigative research is within the realms of current debate.

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FIREMEN: LEARNING TO MOVE WITH LOW VISION

FELICIANA CABAÑAS, NIEVES JIMÉNEZ AND HELIODORO NÚÑEZ
CENTRO DE REHABILITACION BASICA Y VISUAL O.N.C.E.
Prim,3 5a planta 28004 MADRID
(Spain)

The Rehabilitation Program, inside the Social Services, specifically assigned to blind or visually impaired people, has as a main objective the training of those persons in the necessary skills which allow them to have an everyday life with the maximum possible level of autonomy.

This independence in the day to day, so necessary for everyone and helpful to the own well-being, does not only depend on the personal characteristics, abilities or impairments, but also on the environment where the individual grows up and progresses daily.

For all of that, one of the very important tasks, if not fundamental, to the professionals or organizations that deal with impairments, lies in the removal of those barriers - physical and social - that prevent them from living independently, and in the fulfillment of those actions that tend to make easier their lives.

In Spain, the different professionals from the Rehabilitation Services spend most of their work time teaching the skills that will allow blind or visually impaired people to get the maximum possible level of personal autonomy and complete their tasks with several performances in the social and familiar setting.

Thus, courses aiming at improving the interaction with visually impaired people are taught by the Orientation and Mobility Instructors. Collectives ranging from nurses, waiters, hostesses or secretaries participate in them and incorporate these techniques of interaction into their daily work, which will make easier the integration and normalization of the visually impaired.

But even further over these participations in the general social environment, it seems that the orientation and mobility skills taught to the collective of the visually impaired, could improve remarkably the work of other professionals not related with this impairment.

Two accident reports happened during 1992 and covered by the mass media were the beginning of a set of training courses planned for firemen and delivered by Orientation and Mobility Instructors from ONCE (The Spanish National Organization of the Blind) :

- In Cordoba four members of the same family died in a fire. The firemen, despite hearing children crying, could not reach them due to the large amount of smoke that hindered their orientation.

- In Madrid, in a fire originated in the Senate building, four firemen fell down to the swimming pool because they did not know its existence due to the huge accumulation of smoke.

These events made that, in the city of Sevilla, both the Firemen Training Responsibles and the Manager of the Rehabilitation for Adult Blind People thought about the possibility of giving a course, in which these professionals, who in many occasions work under low or null visibility conditions, either for power cut or for the huge accumulation of smoke in some accidents, could learn how to orientate and move in the same way as blind or visually impaired people do.

Since then and up to 1998, several of these courses have been given in Spain: Sevilla, Leon, Madrid, Palma de Mallorca, Malaga and Alicante.

In Madrid, in June 1997, a "Mobility Course under low or null visibility conditions" was organized at request of the Fire Brigade Training Responsibles; of AENA (National Organization for the Management of the Airports), professionals who work at the Madrid-Barajas airport. The objective of this course was to train all the attendants in some of the orientation and mobility techniques for blind and visually impaired people and improve their activity under those poor visibility conditions.

A total of 29 firemen attended this last course with a duration of 15 hours where they learnt, in a theoretical and practical manner, how to move without vision or in low visibility conditions.

This course was carried out by three Orientation and Mobility Instructors (the authors of this paper) and took place in Madrid at the facilities of the Visual and Basic Rehabilitation Center of ONCE where they work.

The theoretical program included:

- assessment of a blindness situation
- use of the other senses as substitutes of vision
- basic concepts about spatial orientation
- methods of systematic search
- personal protection
- trailing
- taking directions
- walking and possible use of the cane
- transmission of information under low or null visibility conditions

A great deal of time was dedicated to make practices. They were performed in pairs according to the way firemen usually work and were related with the theoretical program. These practices pursued a double objective:

-Firstly, that students experienced the difficulties to which a blind or visually impaired person faces when carrying out some tasks.

-Secondly, that each student was trained in the necessary skills to carry out these tasks successfully.

These courses were valued highly by the firemen participants and they concluded saying that it would be very important to take part in periodical recycling processes of the acquired skills as well as include them in the first training for the newly joined firemen to the brigade.

It was also valued positively by the Orientation and Mobility Instructors who gave the course. They understood that the participants not only had acquired a set of fundamental strategies to orientate and move under low or null visibility conditions but had also increased the perception of their own aptitudes, emotion that the modern psychology has considered so relevant when facing a task which results stressful for the individual in major or minor degree.

It is important to emphasize that both groups wanted to spend more training time to the practical phase of this course.

To conclude this work, we would like to think about the fact that although a specific social group needs the society, this also needs the different existing groups. Therefore, instead of segregating these groups, as it is usually done, because do not meet the “rule” for different reasons, if more attention was paid to them not only specific skills could be learnt from them but also other attitudes, values, ideas, etc., establishing in this way a dialectic that would be more fruitful to all the society and allow to drop aside the only and exclusive mind typical of unfair and self-interested societies.

MOTOR DEVELOPMENT IN CHILDREN WHO ARE CONGENITALLY BLIND

SANDRA ROSEN, PH.D.
San Francisco State University
San Francisco, California
U.S.A.

For children, movement is also the natural learning medium. It is the means by which they explore the environment, learn how it functions, and interact with it. In some, although not all parts of the world, children who are born blind are often seen to have difficulty developing mature, refined movement abilities. This paper will focus on the needs of these children.

The Basics of Sensory-Motor Development

Sensory-motor skills do not develop in isolation from one another. For example, severe problems in the ability to walk in a straight-line are rarely seen in the absence of other motor problems. This is why repeated practice of straight-line travel alone is rarely successful in helping children overcome veering problems. In fact, problems in high-level motor skills such as straight-line travel and even touch technique actually have their root in the very basic building blocks of sensory-motor function.

At its most basic level, movement is the result of two intertwined physical functions - sensory awareness and motor output. Sensory awareness includes such things as visual, auditory, tactile, vestibular, and proprioceptive inputs. Motor output consists of muscle tone and coordination. Coordination, in turn, involves a complex array of motor reflexes (primitive, involuntary responses) and reactions (mature motor responses) to environmental stimuli. Operating as a feedback loop, it is the integration of sensory inputs and motor outputs (known collectively as sensory-motor functions) that determines the physical efficiency and effectiveness with which one moves.

Sensory Awareness

The quality of movement depends on a child's ability to interpret sensory information accurately. There are four sensory systems that play a special role in sensory-motor functioning: visual, tactile, vestibular, and proprioceptive.

Vision facilitates sensory-motor development by stimulating, guiding, and verifying infants' and childrens' interactions with the environment. It stimulates motor activities and the development of cognitive relationships. Without this stimulation, children who are functionally blind often experience a delay in the development of fine and gross motor skills.

Touch serves as an interface between children and their environment. It provides information about items that children touch.

The vestibular sense provides information about the position of the head in space. Research has shown that children who have not learned to use vestibular information are delayed in all gross motor activities requiring coordination of both sides of the body and in fine-motor control (Pyfer, 1988). In turn, studies of blind adults have shown that unless the vestibular system is functioning within normal limits, the development of mobility, vocational, and self-help skills can also be delayed (Pyfer, 1988).

The proprioceptive sensory system provides information about a child's body position in space. It secondarily contributes to laterality, directionality, and spatial awareness. Proprioception also plays a vital role in muscle tone and balance as well as the development and maintenance of good posture. Research with congenitally blind children has documented difficulties in areas such as body awareness, muscle tone, coordination, posture, gait, and balance that depend upon proprioceptive awareness for their own optimum development (Jan, et al., 1975; Rosen, 1986; Rosen 1989).

Motor Output

Highly related to the development of proprioception, muscle tone development is a recognized problem for children with congenital blindness in some parts of the world. In such cases, children who are congenitally blind have "hypotonia", or abnormally low muscle tone and demonstrate motor skill delays.

Coordination is essentially the neurological system's co-ordering of activity to organize movement. Essentially, the sensory-motor system processes information about environmental conditions and task requirements and then provides neuromotor control to execute the task at hand. At a neurological level, the development of coordinated movement begins with primitive reflexes (e.g., asymmetrical tonic neck reflex) that exert much control over infants' movements during the early months. These movements provide tactual, proprioceptive, and kinesthetic stimulation as children interact with their environment. These reflexes normally integrate during the first year of life and are replaced by mature reactions (e.g., balance) which form the basis for coordinated, voluntary movement.

If, in the course of development, the primitive reflexes fail to integrate and mature reactions fail to develop, coordination difficulties result. Anecdotal evidence suggests that some of the coordination difficulties that children who are born with visual impairments experience may relate to poor sensory-motor integration of primitive reflexes and poor development of mature neurological reactions. For example, the ability to perform isolated motions is directly related to the integration of reflexes and reactions. Functional problems caused by lack of isolated motions include poor pelvic, trunk, and limb rotation which are prerequisite to good locomotor ability (Ferrell, 1985). Another example is the influence of primitive reflexes that can be called into play unconsciously when people are under physical or emotional stress such as when learning skills of independent travel. For many children with visual impairments independent travel imposes an underlying level of stress due to the increased level of concentration

required by the travel, and increased physical demands that are exacerbated by the presence of hypotonia and a poorly tuned proprioceptive system,. One such reflex is the asymmetrical tonic neck reflex (ATNR). The ATNR interferes with midline positioning of the hand and may play a role in the difficulty some children have in keeping their cane hand centered.

Development of Higher Level Motor Skills Fundamental to Efficient Mobility: Posture, Balance, and Mature Gait (Walking) Patterns

To a degree, children learn correct posture through modeling of people around them. To a much larger degree, however, posture depends on the interplay of sensory information, coordination, and muscle tone - the building blocks of movement. To compensate for problems in these areas of development, children with visual impairments often use abnormal postural adjustments to maintain a position or to support movement. Examples of these adjustments include elevating the shoulders to provide neck stability, rounding the shoulders; leaning the trunk backward, and rotating the pelvis anteriorly to lock the hips in place and to maintain an erect posture. These positions, in turn, interfere with such motor activities as moving the head when visually and auditorily scanning and when using the arms to reach. They also interfere with the development of mature gait patterns, balance, and straight-line travel abilities.

Dynamic balance, that used during movement such as when walking or running, results from the integration of several sensory and motor functions including vestibular, proprioceptive, and visual inputs; muscle tone; and neurological reactions (e.g., equilibrium reactions). Dynamic balance, however, is often not fully developed in children with congenital blindness and research has suggested a possible correlation between poor dynamic balance skills and straight-line travel ability (Rosen , 1989).

Gait is the normal manner of walking. The gait pattern of sighted toddlers is generally characterized by short stride lengths, a wide stride width, and a lack of reciprocal arm swing. As the child matures, the stride width narrows, the step length increases, and a reciprocal arm swing develops. Hypotonia, limited proprioceptive awareness, and poor development of neurological reactions, however, may interfere with the development of mature gait patterns in children who are born blind. For many of these children, their spatial gait patterns plateau at an immature level that is characteristic of the sighted toddler (Rosen, 1986). In addition, many people with congenital blindness show a larger than normal degree of out-toeing. The development/retention of mature gait patterns is important in several ways. Immature gait patterns have been shown to negatively impact mobility. Evidence indicates, for example, that as out-toeing occurs, there is an increase in the tendency to veer from a straight line of travel (Rosen, 1989). Also, anecdotal evidence suggests that immature gait patterns are associated with decreased endurance in travel (logically due to the higher energy demands of less efficient motor performance).

Implications for Orientation & Mobility Specialists and Future Directions

Preliminary research and theory suggest that problems in the performance of high-level motor skills such as using a long cane and straight-line travel may actually have their root in the basic sensory-motor building blocks of coordination, muscle tone, and sensory awareness. While it

is not currently possible in the space allowed to discuss activities that orientation and mobility (O&M) specialists can do with young children who are blind to facilitate the development of mature, effective sensory-motor skills, there is much that can be done. Anecdotal evidence suggests that providing motor development activities that emphasize the development of sensory awareness, muscle tone, and neurological integration, especially during the preschool years, can positively impact the later development of basic motor skills, posture, gait patterns, and coordination that in turn provide the foundation for more effective mobility.

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QUESTIONNAIRE TARRAGONA OF ANXIETY FOR BLIND PEOPLE [1]

A tool for facilitating the psychological intervention in the adjustment process

RAFAEL PALLERO,
psychologist of ONCE

PERE-JOAN FERRANDO AND URBANO LORENZO,
professors of Department of Psychology, University "Rovira i Virgili".
Tarragona, SPAIN.

The initial objective of this study was to develop an instrument to assess some of the reasons for a) the learning and learning maintenance difficulties; b) difficulties in generalising what is learnt in the Orientation and Mobility courses; and c) the personal difficulties in carrying out the process of adjustment to discapacity , that blind and visually impaired people may experience.

In order to achieve this, an anxiety questionnaire that intends to measure the cognitive and physiological reactions directly related to autonomy, was designed.

The result was a questionnaire (called Cuestionario Tarragona de Ansiedad para Ciegos C.T.A.C. the original Spanish title of the questionnaire), with a high degree of reliability, which can be used for the measurement of this psychological variable. At present, the research is studying its criterial validity and verifying if the C.T.A.C. is useful for the initial aim above proposed.

Introduction.

Serious visual loss acts as a disturbing factor in disabled people in their psychological, social and personal situation. This affects , from day to day, certain details to complex psychological variables. The affected person must modify his perception of his surroundings, the way of solving the day to day questions, and, also, he must remake the way in which he faces new emotional situations as well as the perception he has of himself.

All of this means that, during a given period of time, that depends on each case, the person have to undertakea process we denominate 'adjustment to discapacity'.

During the adjustment process, among other things, the person have to perform certain cognitive rectifications and specific perceptual adaptations, manage his own emotions and learn an important group of news skills. The person must also modify certain attitudes referring to a

[1] This study was financed by the National Organisation of the Spanish Blind (O.N.C.E.) in their support programme for the research into blindness and visual impairment.

variety of questions and a variety of concepts about himself, now a disabled person . In addition and during some time, he will carry on an amount of anxiety, which is inhabitual in him and will possibly affect him in the totality of the adjustment process.

One of the processes he will have to master is the learning of skills that allow him the autonomy in his displacement. It is mainly on this point, that we will be concentrating. Among the members of rehabilitation teams for the blind and visually handicapped people, it is not rare to find remarks about how people seemingly suitable and capable of learning, have difficulties following the O & M courses and, as in other cases, certain persons achieve success but they can't sustain these skills in non- educational situations and cannot generalise in situations not similar to those of his training. These remarks are accompanied by the observation that in other cases these difficulties do not appear. Likewise it is observed how some people, although having achieved autonomy, do not live comfortably nor without emotional disturbances and they continue with the adjustment problems.

In all the process, the visually discapacitated person usually explains how ideas about his uselessness perceived, what he did before, or what the others think about him or his possibilities, appear in his mind repeatedly. Usually he also explains, how when confronting situations with new required skills or with the habitual ones but used in a different way, he feels he has an upset stomach or an increase in heart rate. This is why it was felt that it would be useful to dispose of a specifically created instrument for this population which would measure anxiety in situations directly related to the loss of vision.

Development of the scale

The STAI (Spielberger, 1970), ASB (Hardy, 1968), MAS (Tailor, 1953), NAS (Dodds, 1991), MAE (Pelechano, 1975) and CAR (Aguilar, 1984) questionnaires were revised. Based on the experiences of the team members in the field of visual discapacity, a questionnaire was created in which (transparency 2) the subject is required to construct in his imagination a situation (whether he has lived it or not) related to his visual discapacity and he is asked to evaluate, based on a suggested adjective, the degree of anxiety which he believes would be feeling if he were really living out the situation. The assessment is carried out on the basis of a 5-point Likert scale .

In 1992, a 150 item set was drafted, of which 104 were subjected to the criteria of referees (15 experts: 10 O.N.C.E. psychologists, 4 technicians of basic rehabilitation - psychology degree - and a psychology personality professor). Forty-two items were the result of the evaluation, which, although they are presented mixed, some measure physiological anxiety (27) and some cognitive anxiety (17).

The experimental test was administered on 162 visually impaired people (92 men and 70 women) of whom 40% had some visual function. The test was administered by ONCE psychologists within their habitual work, by reading it to the subject, in the process of assessment by the rehabilitation team, for the design of an individual program of intervention.

Analysis of data shows the following main results: (a) the scale behaved as reasonably bidimensional, with a clear and simple structure once 7 items were omitted.. The 35 resulting items (20 and 15) were factor-analysed in a new sample (transparency 3), allowing a clear distinction of two scales. The reliability analysis give values of 0.90 (Cronbach's alpha) for cognitive and 0.91 for the physiological anxiety. Therefore, we know that we have a psychometric instrument that allows for the specification of a great range of anxiety in visually impaired people, and which is supposed to measure with acceptable precision. We do not know, however, if the test is useful for predicting a criterion (learning in O & M and maintenance and generalisation of the learned material).

For this reason, a project that permits the verification of the criterial validity of the C.T.A.C. was started (September 1997). We requested to all ONCE psychologists, related with any area of rehabilitation of the blind and visually impaired people, to administer a certain protocol. The population of destiny are :

- Blind or visually impaired people.
- Older than 16 years of age.
- Without other important handicaps.
- Those who need training in news skills.

31 psychologists (90%) responded affirmatively. In the protocol (transparency 4) the psychologists were requested to:

1st .Fill in a data sheet concerning the individual.

2nd. Administer the STAI, NAS and CTAC.

3rd. Exchange their previously prepared plans.

4th. After the course (principal axis),gather the evaluation of the mobility specialist concerning 10 points of skills for day-to-day and 12 points of O & M. Also, although this will not be included in the analysis, the result of braille and tiflo-technology classes (if these were done) and the use the oral book, recorded magazines, "audesc" (movies explained for the blind), sport...In this 4th point, the psychologist noted their interventions (individual, group, and family).

5th. Three months after the 4th point, to administer the NAS scales "C" and "E", a self-report (transparency 5) in which the person is asked to evaluate 8 points related with their subjective well-being and 16 points about the use of skills learned during the course.

6th. Fill in a report about their opinion of the well-being and the quality of life of the individual and give their opinion about the maintenance of what had been learned and its possible generalisation.

As main criteria will be: a) the evaluation by the specialist (4th point.), b)the re-administration of the abbreviated NAS (point 5th.) and c) the self-report.

In addition to all that is presented here, and, within the same project, a computerised system of self-administration of the CTAC was created, which, currently is being tested at an ONCE

centre in order to check whether there exists significant differences between the self-administered test and the test when administered by some another person.

THE **ARIADNE** PROJECT
SUPPORTING ACCESS, NAVIGATION AND INFORMATION SERVICES IN THE LABYRINTH OF LARGE BUILDINGS

KEITH BRIGHT & SUE FLANAGAN
Research Group for Non-Handicapping Environments
Department of Construction Management & Engineering
University of Reading

The ARIADNE Project

BACKGROUND

The ARIADNE Project is funded under the EU Telematics Initiative for Disabled and Elderly (TIDE) programme which is concerned with improving levels of accessibility for elderly and disabled people when navigating around public buildings. The aim of the project is to provide a technological support system which will be installed in public buildings using networks, nodes and contactless Smart card technology.

The Project, which is being co-ordinated by the Department of Cybernetics at The University of Reading, started in early 1997 and has brought together a multi-faceted consortium of building designers, technologists and users. Other members of the consortium include Projectos Desenvolvimento E Technolgia LDA (Portugal) and MicroDesign SA (Norway) providing the technological input; SINTEF Unimed Rehab. (Norway) and the Royal National Institute for the Blind (UK) providing the user involvement; the Research Group for Non-Handicapping Environments (RGNHE), at The University of Reading and Italian architects Ipostudio Architetti Associati, addressing the building design issues.

*WHAT IS THE **ARIADNE** SYSTEM*

The ARIADNE system is essentially a network of intelligent signpost nodes that are distributed at junctions around the building. The operation of the system can be described with reference to *Fig 1* [1]. When the visitor arrives at a building, they will register at a point of control (e.g. a reception desk, ticket office, security point etc.). At this point, any special needs that the visitor may have, can be entered into the ARIADNE system together with an itinerary for their visit. This information is then stored in a central database, and the visitor will be given a smart card that could be worn in the same way as a security tag. As the visitor moves around the building, the passive smart card will be sensed by series of nodes. The function of each node is to give information to the visitor using a variety of methods, e.g. aromas [2], illuminated signs, speech synthesis and the facility for IR communications to the user. The integrated node can access the database over the network and discover the particular needs of this visitor. The navigation node is also able to integrate with other building control systems, so a visitor in a wheelchair may have doors opened for them, heating levels could be adjusted in previously unoccupied rooms or the lighting level could be increased to help a visitor who

is visually impaired. Interoperability with other systems, e.g. the fire alarm, will assist efficient handling of evacuation procedures.

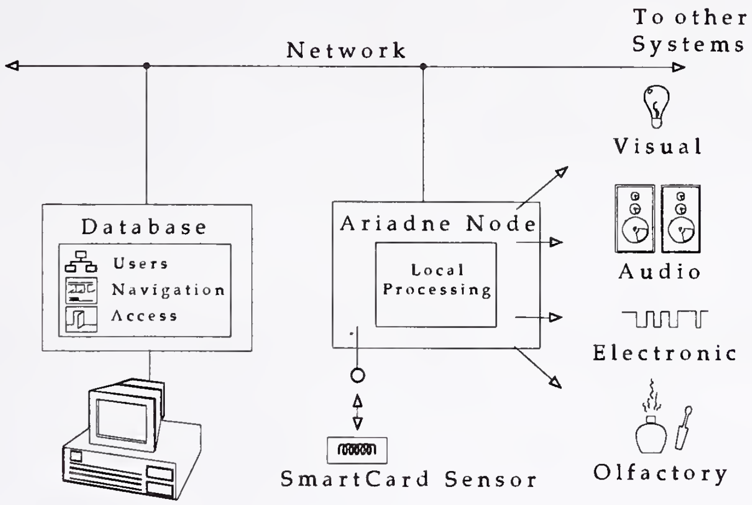

Fig 1 Overview of ARIADNE System.

WHO WILL BENEFIT FROM THE ARIADNE SYSTEM?

The main beneficiaries from the ARIADNE system will be ***visitors*** to buildings and ***building operators***, both of whom have very different requirements.

Visitors

Physical access, navigation and information are all important issues for visitors to public buildings. The ARIADNE system will be designed to address the needs and requirements of all visitors, but particularly those with special needs including people who are:

- visually impaired and blind
- cognitively impaired
- hard of hearing and deaf
- elderly
- temporarily restricted in ability, e.g. pregnant women, people with broken legs, arms, people carrying heavy bags, etc.

A visitor with special needs must feel confident when using a public building. This confidence will only be obtained if the user receives on site, easy to understand information to assist navigation, and the building is made physically accessible for all users. The ARIADNE system aims to provide a cost effective solution that addresses the needs and requirements of all users, however, it has been recognised that the system must not be dominated by technology, otherwise the user will need special skills to use the system.

Building Operators

The target market of ARIADNE will be organisations that operate or own buildings. However, the main concern for the building operator will be the cost of the system and value for money.

Building operators are primarily concerned with issues related to security, and health and safety, both of visitors and employees. Therefore, the system will only be adopted if building operators can be convinced that there will be added value services, e.g., tagging items of equipment such as packages, trolleys and wheelchairs, which will assist audit work. If the ARIADNE system is installed, it could provide information to the building operator about the location of visitors within the building, and will also record people entering and leaving the building for the purposes of access control.

Building Design Issues

The supply of new public access buildings is at a low level, and this trend is unlikely to change in the foreseeable future. Therefore, the ARIADNE system is being developed with an emphasis on retrofit installation into existing buildings. To ensure that the system has the potential to be used in a variety of different situations, it is being developed to operate on a modular basis. This will maintain flexibility within the system and allow retrofit customised installations to be designed to meet the needs of particular building operators. This will make the ARIADNE development attractive to building owners and occupiers of small buildings, where only a few modular components may be installed, through to much larger buildings, such as an airport, where scores of modular components may be needed. The information provided by the system will be enhanced by considering the architectural features of the building, e.g. the use of floor textures, tactile surfaces and colour [3]. The physical location of the navigational nodes and how they fit into the building infrastructure, will also be very important.

Building Needs

If the introduction of the ARIADNE system is to be successful, it is necessary to consider not only the needs of the users [3], but the needs of existing buildings. The building needs will incorporate constraints already present in the building which can be summarised as:

- planning, legal or historic restrictions
- restrictions caused by the layout of existing services, e.g. underfloor pipework
- restrictions caused by existing fire protection, together with sound & thermal insulation
- physical constraints due to existing pillars, columns, ceiling heights in the building
- restrictions caused by the original specification, such as the use of asbestos
- restrictions due to the aesthetic appearance of the building, e.g. cabling, nodes or sensors may spoil the effect
- restrictions due to ownership, e.g. leasehold, freehold, multi or single let, multi or single ownership
- restrictions due to existing technology installed in the building, i.e. using Radio Frequencies (RF)/Infra Red (IR)

Other issues which need to be addressed include how the building operates and is used. Generally, visitors arrive at a building either accompanied or unaccompanied, and need to find a person, or feature, within that building. They may be visiting for the first time and are unfa-

miliar with the layout, or they may be familiar with the building either as a visitor or employee. There can be time constraints, e.g. when a visitor has a prearranged appointment, and there will be parts of the building that are accessible to members of the public. Movement around the building can be either controlled, where there is only one way or a restricted way for the user to navigate around, or it can be uncontrolled, where there is no restriction and the user can chose any way to navigate around. RGNHE have been interviewing building owners and managers to establish how public buildings are being used and to identify the main problems experienced by building owners, managers and users. This information will form the basis of design guidance which will be issued at the end of the project.

Conclusion

The whole concept behind the ARIADNE system is to provide a wayfinding mechanism that enables the user to navigate easily and confidently around a building in order to locate a person or feature within that building. The system needs to operate at a long distance with immediate/semi-immediate effect, and provide enough information to assist the user without causing confusion. Too much information given to the user initially can result in information overload which can lead to disorientation. It is far better for the system to provide simple assistance that works, than complicated procedures that break down and fail to deliver the correct information to the user who is trying to navigate around a building.

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MOBILITY AND ORIENTATION IN THE NEXT MILLENNIUM

PETER WILBY
National Rehabilitation Services Manager
The Guide Dogs for the Blind Association
Hillfields, Burghfield Common, Reading, Berkshire, RG7 3YG, UK

In this paper, an overview is given as to how services for visually impaired people in the U.K. have evolved since 1948, how they have been influenced by economic factors and evolving social policy, and implications that arise for "third sector" (voluntary, charitable and not for profit organisations) as we head toward the year 2000 and beyond.

Social Rehabilitation for people with visual impairments

Social rehabilitation can broadly be described as falling into four areas: technical (i.e. communication and daily living skills); orientation and mobility; social work or personal support; and low vision. It has been estimated that there are approximately 600 qualified and practicing rehabilitation workers in the U.K., although estimates vary. GDBA employs 48 and about 60 are employed by various education authorities, schools or colleges.

How personal social services are funded

National government provides the bulk of finance for personal social services through central taxation. A U.K. total population of 59 million is served by 190 local authorities who have direct responsibility for providing services in their geographical area. They raise additional finance through charges on the local community. A relatively small, but growing amount is raised from charges levied on service users, i.e. home care.

The third sector provides some services either directly or under contract with a local authority, perhaps utilising some of their own funds.

Historical perspective

The introduction of the National Assistance Act in 1948 provided for a system of universally available State provided social welfare, free at the point of delivery to everyone, no matter what their age or economic status. Another concurrent Act of Parliament covered health services which included low vision (although legislation varies between Northern Ireland, Scotland and England and Wales, the main legislative thrust and emerging issues are common).

Rehabilitation work and social policy

Prior to 1980, training was provided by technical officers who were responsible for daily living and communication instruction and by mobility officers who concentrated on orientation and

mobility work (particularly long cane training). In 1987 the decision was taken to combine the two functions and create a new post of rehabilitation worker, whose role would encompass all aspects of social rehabilitation and provide for a more "rounded" service. Whilst in theory I supported the move, I was not alone in adopting the view that workloads were such that the diminishing "luxury" of time consuming O&M provision would be overridden by other day-to-day demands. Regrettably, that eventuality came about. Pressures would have been the same, but it would have been easier to argue the case for the retention of a specialist and focused O&M service before it declined further.

In 1990, "Care in the Community" legislation was introduced. Services are now structured with the emphasis on assessing individual need and being flexible and imaginative in meeting it, rather than fitting the individual into a range of existing services which might or might not adequately meet their identified needs. It provides for the assessment process to be separated from service delivery. The intention is that local authorities increasingly become purchasers rather than providers. This new "contract culture" opens opportunities for the third sector to become more involved in direct service delivery. To date, this has only been partially successful, primarily due to the lack of financial resources to meet rising demand.

Legislative demands relating to children and the need to provide for an aging population are also contributing to the problem of maintaining service viability and standards of provision. The number of elderly people is set to increase over time. By the year 2050 it has been estimated that those aged 75 years and over will have increased by 50% and those aged over 80 will have doubled. During the intervening period, pressure on services will inexorably increase.

The "third sector"

Questions are therefore raised for the third sector. A co-ordinated vision of the future needs to be developed which will require radical thinking between and within organisations nationally and regionally. This needs to be taken forward at ministerial and other levels to try and ensure services are maintained or conserved and the training of professional workers remains responsive, flexible and readily available.

Quite understandably in the circumstances, a tension exists as to where the line falls between the State's responsibility and that of the third sector. Unless the issues are addressed, the third sector will increasingly find itself reacting to, rather than playing a positive role in trying to shape events.

There are signs that some organisations are beginning to recognise and address the issues. It might be a choice between sticking to a current course and allowing services to erode or stepping in and positively influencing and engaging in direct service provision.

For example, over the past eight years, The Guide Dogs for the Blind Association has begun to meet the challenge. It has entered into approximately 90 various agreements with local

authorities to provide daily living skills or orientation and mobility training. As a result, approximately 10,000 people who might not have received adequate assistance have been helped.

Other large regional or national organisations, including The Royal National Institute for the Blind, are also entering into or exploring the possibility of partnership agreements. There are, therefore, grounds for cautious optimism for the future.

A multitude of organisations with a strong local presence also play a varied and important role in the totality of services. Some are traditional in approach and run the risk of becoming marginalised in a changing environment. For many, without help it will not be easy to make the change if they want to. For example, acquiring the necessary professional expertise, developing and underwriting the cost of an alternative infrastructure, management systems, etc.

Elderly members of society

Visual impairment is a problem for many elderly people who often passively accept it as a normal part of the aging process. In the U.K., 75% of people registered as being blind or partially sighted are aged 75 years and over. As I have previously stated, their growing numbers is a common factor to many countries and will critically influence social policy over the next ten to twenty years. It is now obviously impacting upon the U.K. and the rest of Europe. One test of a society is how it treats older people. Individuals, no matter what their age, invariably have, albeit in some instances limited, aspirations and potential. One crucial question is how to balance the increasing quantity of life with quality of life. While medical and technical advances make this possible, political will and resourcing those possibilities remains problematical.

For older people and those with disabilities, getting from one place to another is a basic need and fundamental in promoting independence and countering isolation and loneliness. People would be much more mobile and their quality of life improved by input from, amongst others, O&M specialists. Not least of all, those housebound, in residential care or in receipt of day care services whose access to O&M provision is often restricted or non-existent. More could be done by training auxiliaries, volunteers and developing greater input into the training of other professionals so that they are better equipped to play their part, i.e. occupational therapists, physiotherapists, social workers, home care workers etc. Whilst in many places this already occurs, it often does not form part of an overall co-ordinated strategy.

Similarly, consideration needs to be given to people with a dual sensory loss, physical disabilities, learning difficulties, etc. They require access to the expertise of O&M specialists.

Low vision

Low vision is generally seen to be a separate issue. The quality, and availability of services and associated training needs are currently being debated. There has been only a tenuous link between medical assessment, prescription and funding of equipment on the one hand and functional assessment and training on the other. This is one area where I think significant developments will take place over the next ten years.

The way low vision services are provided is symptomatic of a wider problem affecting services for visually impaired people. We need to move away from the compartmentalised way we organise and deliver our services to bring about greater integration of social welfare, employment and education, based on a whole person approach.

Training

Professional training is under debate. Obviously, unless it is clear what services are to be provided, it is difficult to devise training strategies to meet market requirements.

It is likely that training will be increasingly modular based. Core skills will be developed with options allowing people to develop areas of special interest. This might provide for the re-emergence of an orientation and mobility specialist. Formal opportunities will probably exist for other professional workers to develop knowledge of visual impairment: home care workers, occupational therapists, social workers, etc.

Because professional training is bound up with service provision, neither can be considered in isolation. The resolution of these intertwined debates will have an influence on the way services develop. It could be argued that unless a separate profession or specialist agencies emerge, O&M provision will continue to languish. There is certainly a need for some empirical research to identify the extent of the shortfall.

Medical science and technology will make further inroads into the prevention and resolution of visual handicapping conditions. This will have a significant impact on the training of those people who are to specialise in O&M. Unfortunately, whilst the means will be available to alleviate visual impairment, resources required to meet identified need will remain a problem: medical treatment and technology costs money. Consequently, there will be a need for O&M workers for the foreseeable future. It is unlikely technology will provide an alternative to guide canes or guide dogs.

Summary

Demographic changes highlight the needs of an escalating elderly population and raise issues as to how we can do more to counter the effects of visual impairment.

In the U.K. we seem to be returning to a position not too dissimilar to 1948 with the third sector assuming or being expected to take on additional responsibility for services that the State hitherto has been responsible for. A structured and proactive approach will be required where quality and efficiency will be important issues.

Opportunities will continue to exist for the third sector. However, this will demand a flexible, imaginative and positive approach. The sector's reaction to these changes will critically influence the lives of visually impaired people beyond the year 2000.

The overall training of professional workers will need to remain responsive to change in a rapidly developing technological age.

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THE ABC'S OF EARLY ORIENTATION AND MOBILITY

SANDRA STIRNWEIS, MA, COMS
Foundation for Blind Children
1235 E. Harmont
Phoenix, AZ 85020 USA
SandraSt@JUNO.com

Although the practice of teaching orientation and mobility skills to preschoolers is becoming more common it is still approached by many from a rehabilitation standpoint with the cane being the primary focus. However, the way in which these skills are taught to children is very different than the teaching of these skills to the adventitiously blinded adult. Emphasis needs to be placed on the child's developmental level and physical abilities as well as the type of aid that will best suit their needs.

It is important for the O&M Specialist to teach the necessary prerequisite skills in order for the child to be a successful and independent traveler. The ABCs of Early O&M are Aids, Body, and Concepts. These ABC's are intricately linked and interdependent. The child cannot excel as an independent traveler without all three.

Aids—this includes any device that assists the child in being a safe traveler. It may be a long cane, pushcart, AMD, walker, monocular, spectacles, etc. Their primary purpose is to provide safety and information. However, the child cannot use the aid effectively without the proper conceptual understanding of what it does and the body awareness and coordination to manipulate it. The aid a child uses may change as their skills change. It is important to be flexible in choosing and changing the aid to allow the child the optimal freedom of independent movement.

Body—this includes not only body concepts but also coordination and motor planning. "Body" is the way in which the child develops gross motor planning skills that are essential to good mobility through space. Components of this include vestibular stimulation, proprioceptive development, muscle tone, and movement and coordination. It is impossible to expect a child to be able to push a cane in front of them if they do not have the proper muscle tone. If a child does not move quickly enough through space it will be much more difficult to interpret auditory and other sensory information.

Concepts—this area is perhaps, the largest of the three. It includes spatial and positional concepts but "concepts" are not just the body, spatial and positional concepts one usually thinks of. It also includes environmental concepts, behavioral concepts, and functional concepts. There are many abstract concepts that the congenitally blind child does not grasp. Some, like why people with sight cannot see through walls, are sometimes overlooked because it does not fit into one of these three most commonly thought of categories. The concepts behind proper listening skills and the concepts that go into appropriate social skills are others. It is very difficult for a child to demonstrate a skill without understanding the concept behind the

skill. A child may be able to push a cane in front of their body but if they do not understand the concept that the cane is an extension of their arm, providing important environmental information, they will not stop when the cane encounters an object. A child cannot move smoothly through their environment if they cannot conceptualize how that world is put together.

Student 'M' is a typical preschool child in many ways. At three years of age she had poor muscle tone and walked at a very slow pace. She did not know many body positional or spatial concepts and had trouble motor planning through space. Her language development was delayed. Throughout her initial assessment (which was observation-only) she was cheerful and interactive. A plan was quickly formulated to improve 'M's ability to travel well in her environment.

The "aid" chosen was a standard cane with a few modifications. The grip was removed so her small fingers could fully grasp the cane. A Tactile Color texture, that 'M' chose was used to assist in proper hand placement. The cane was fitted with a roller tip to provide some resistance for building muscle tone while rolling to provide ease of movement. 'M's "body" component was extensive. Regular sessions on an electric treadmill were instituted to increase her rate of travel by forcing her into a faster walking pace in a safe environment. After the first month 'M' was able to sustain this faster pace for short distances off the treadmill as well. The more time she spent on it the longer this pace carried over into her regular walking pace. Her resistance to "running" also decreased as she realized that she was safe at a faster pace. To improve muscle tone and proprioceptive development 'M' spent much time crawling on her hands and knees. Initially she wanted to crawl on her forearms. So she spent some time on "all fours" getting used to the sensation through her arms. Then she began crawling on flat surfaces. This progressed to crawling through objects and up and down various inclines. Movement songs were used to teach various motor planning activities in a format 'M' enjoyed. 'M' was very bright and developed body and positional concepts quickly. She greatly enjoyed the songs and games that taught these skills. Some of her best language development was seen in this area of her program as she asked for specific songs or concepts that were her favorites. She also learned the concept of "stationary" vs. "moving" objects. She learned that rooms and many large objects stayed in the same place all the time but as she moved her relationship to them changed.

Initially all of 'M's cane skills were done hand over hand. However, as she developed better muscle tone from the activities in her "body" component, she was able to independently push the cane in front of her in the proper position. As her walking pace improved she was able to better conceptualize the layout of the school campus and her position in space. This allowed her to travel independently between locations and maintain her orientation. She was also better able to use her listening skills because the information came to her in clearer bursts at her faster pace. Because she understood body concepts she knew what it meant to put her back against the wall to square off. She also knew the difference between straight ahead and to the side and her faster walking pace made it physically possible for her demonstrate this.

'M' still has a long way to go in her orientation and mobility program. However, at four and half years of age she is much farther ahead than if she would have been given a more traditional

program. Because she did not have any physical impairment her motor planning difficulties, pace, and muscle development might not have been provided by a physical therapist. 'M' has developed excellent kinesthetic skills. Now that she is able to move quickly enough to realize she is moving, she is able to judge her distance traveled through large open areas very well. She is transitioning to a cane with a standard grip as her finger get long enough to grasp it fully. Her program continues to focus on improvement in speed of travel, muscle tone, and concepts; all of which positively impact on her ability to use her cane effectively.

Student 'S' was an excellent cane traveler. At the age of two she was traveling independently with push toys and quickly mastered the art of using a cane. However, as she got older her O&M skills did net seem to progress as quickly as some of her other areas. She still continued to use her cane well and was confident in her travel abilities but was not able to get to where she wanted to go. By examining the ABC's deficiencies were found in her conceptual understanding. She could not conceptualize the layout of her world. She did not understand that all walls were not connected and so sometimes you had to let go to get where you wanted. She knew how to square off but did not internally understand with her "body" where straight ahead was. An intensive program of conceptual understanding of her environment coupled with activities to improve her body's understanding of straight ahead have greatly improved her ability to map her environment and travel independently and accurately. She will transition into Kindergarten at a much higher level than if her skills had not been analyzed and improved using the ABC's concept.

It was clear early on that 'D' had many deficiencies in the "body" and "concept" areas of his development. His motor planning skills were severely lacking and he was tactually defensive. He showed no regard for objects or people in is path of travel. He refused all aids; both one and two handed. For two years his program focused on motor planning skills, proprioceptive development, awareness of others and reduction of tactile sensitivity. In a short amount of time he had quickly mapped the campus. However, he was not safe in his travel to himself or others. He would use no protective techniques and stepped on any children on the floor. Slowly his proprioceptive awareness improved along with his muscle tone. He was physically able to sustain self-protective techniques for short distances and would begin to put hands out in anticipation of objects when warned. He slowly began to be aware of others in his environment and show concern for them. He would go around when prompted and showed less anger at being redirected from his line of travel if told someone or something was in his way. Throughout all of this 'D' never enjoyed bumping into objects and would get very upset when it happened. However, he still did not want to use a protective device. This "concept" was the next step in his program. Typically a child with his disabilities would be given an AMD. However, 'D' would not push a cart or any two handed device and did not the large PVC form used to make many one handed AMDs. By analyzing his "aid" preference an AFB Kiddie cane was chosen. Using hand over hand technique with the cane, 'D' encountered many objects with the cane. He would then be assisted to look at what was in his was. The first sign of his conceptual understanding of this concept was when he voluntarily went in another direction, usually leaving his cane behind. This slowly progressed to the realization that the cane was offering him not only information but protection. It happened when he left his device at one object and immediately bumped into another object. The cane was immediately given to him

and used to encounter a series of objects in quick succession. 'D' showed less and less resistance to the hand over hand technique with each object. He tentatively reached out to see what was there. He did not leave the cane behind. With this concept in place 'D' now uses the cane with minimal assist. When he transitions into Kindergarten in a few months he will take with him a device that he understands and can use for both safety and information.

In every one of these cases, the ultimate objective of good cane traveling would have been lost if the underlying factors involved in using the cane had not been examined and developed first. Although it has not been a major focus of instruction in the past it needs to be seriously considered, even with the traveler who seems to have no apparent travel difficulties on the surface. By teaching the ABC's we provide a well-rounded appropriate orientation and mobility program for young travelers. And by teaching these skills early we avoid perpetuating the problem and potentially making it worse.

LOW VISION ORIENTATION AND MOBILITY FOR CHILDREN: PREVIEWING THE ENVIRONMENT
Guidelines, Strategies and Games

BETSY O'DONNELL & FABIANA PERLA
Pennsylvania College of Optometry
1200 W Godfrey Ave., Philadelphia, PA 19141
New address as of 6-1-98
Elkins Park Campus,
8360 Old York Rd, Elkins Park PA 19027

The goal of this presentation is to suggest guidelines and strategies for teaching visual interpretation of the environment to students with low vision. The term visual preview refers to the ability to use vision to look ahead in the environment and scan for cues and landmarks to assist in orientation, problem-solving and judgment decisions regarding safety (A.J. Smith, personal communication, 1997). We encourage the use of visual preview in conjunction with other sensory cues to facilitate best judgement. Furthermore, combining vision with the other senses and the long cane provides a comprehensive approach to moving through the environment. For some children, using a cane will be crucial for the development of visual efficiency while traveling. The cane can be used for detecting low lying objects, depth changes, and confirming information received through the other senses, while vision is freed from looking down toward the ground and made available to scan more of the environment.

While many Orientation and Mobility therapists are very systematic in teaching long cane skills during mobility training, some may be more casual when introducing visual skills. We make a point of beginning in an uncomplicated, controlled, sometimes familiar, indoor environment to enable the student's learning of cane skills in a step-by-step approach. We then gradually integrate the cane skills as part of a route. When we teach use of vision, the same sequencing considerations apply, in terms of beginning in an uncomplicated, controlled setting, focusing on learning specific visual skills, and eventually incorporating them into functional tasks. For example, a student would learn to eccentrically view first without, then with a telescope, gradually incorporating its use in more challenging tasks.

Let's look at some skills involved in visual preview of the environment:

1. <u>Basic visual motor skills</u>: Visual tracing, scanning, and tracking are often emphasized during mobility instruction. But, having these skills is not enough. The question is how are they implemented in everyday life. A student may be able to scan systematically for items on a tabletop or on a blackboard, but is he actively scanning for landmarks and cues when traveling? It is important for us to point out the practical applications of the different skills and encourage the student to practice them in functional settings to ensure transferability. This is

also true for visual tracing and tracking skills. One of the activities you will find in your handout is called "Lining Up" and it encourages the integration of scanning, tracing and tracking skills. Students are asked to enter a public building, such as a post office, bank or train station and visually scan for lines of people and guiding ropes to locate the service area. Visual tracing may be necessary to follow the rope until it ends. Finally, tracking people ahead of them will indicate their turn to be served.

2. Color/contrast, shape and contextual cues: These cues are the basics of visual analysis of the environment. Some students may need to learn to effectively question themselves when looking at an object to gather the necessary information. To identify it, they might ask themselves: What shape is this?, What color is it?, Where is it located? To make use of these cues, considerations such as distance and positioning, may be involved. Sarah, for example, has a distance visual acuity of 3/400 in her better eye. While traveling she had no problem avoiding obstacles, but was not able to identify them. Her strategy consisted of getting as close to them as she could to see details more clearly, but this was usually unsuccessful in obtaining "enough" information to identify objects. What a surprise when she realized that by distancing herself from objects she could take fuller advantage of the information available, namely through color, shape and contextual cues to get a more complete picture.

3. Blur interpretation: This skill allows students who can already identify objects at near range to do so at greater distances. A typical example is the student who can not see facial details but still recognizes friends from a distance by cues such as height, hair color, and their distinctive walk. A game that may help develop this skill is included in your handout. It is called "Clearing up the Fog". It involves asking the student to locate an object before he can identify it, describing the object's color, shape and location. Then, ask the child to walk toward the object until he can identify it. Once more, have him return to the starting point and check out how it looks from a distance. Continue practicing this activity in different environments until the student becomes more proficient and comfortable with decision-making based on blur interpretation. An alternative to walking toward the object is to use a distance optical device, such as a hand-held telescope.

4. Visual closure: There are many instances when objects in the environment are partially blocked or obscured, such as a car partially hidden by a wall in front of it, requiring visual closure for identification purposes. For the child with low vision, this skill is especially helpful when objects appear to them as partially visible due to glare, scotomas or other visual field limitations. Students need to learn to look for the available pieces of information. Then, they need to match what they see with what it could be, relying on visual memory and filling in the missing information, as if putting together a puzzle. Next, taking into consideration the environment and location of the object, they can determine what it is.

Now, we would like to share the following guidelines that may assist in becoming more systematic in your planning and teaching of visual efficiency:

1. Gather Important Background Information: Understanding your student's level of visual functioning is critical to identifying strengths and weaknesses and planning according-

ly. Smith and Geruschat (1996, Foundations of Low Vision) identify the following steps of a comprehensive visual assessment: a) reviewing clinical vision reports, b) evaluating functional visual acuities and fields, c) assessing the impact of environmental factors, such as glare, lighting conditions, etc. and d) observing use of functional vision in mobility situations, such as whether visual cues are used in a systematic, reliable manner in various environments.

2. Make Lessons Meaningful, Motivating and Fun: Plan activities that are challenging enough, but at the same time attainable for the child. With success comes increased interest and motivation to use vision. The O&M Specialist is in a unique position to teach the practical applications of different visual skills, through the use of games and functional activities. For example, visual tracking can be applied in a variety of interesting settings, from following clerks in a store to enjoying an animal's movements in the park.

3. Teach Isolated Skills and Gradually Integrate Them: Initially, teach basic visual skills in isolation and in simple, controlled environments. Gradually introduce combinations of skills and begin integrating them. For example, a student may begin learning visual scanning indoors, walking down a hallway, popping balloons suspended from the ceiling as part of a game. The same visual skill, scanning, when applied outdoors, may enable him to visually locate landmarks at eye level as well as warn him of overhanging branches.

4. Follow the Visual Developmental Sequence: It is important to be aware of and follow the visual developmental sequence of skills when planning lessons to enhance visual functioning. Students should not be required to perform visual tasks beyond their mental abilities. For instance, a child who cannot identify basic geometric shapes is not ready to receive instruction in visual skills such as blur interpretation and visual closure.

5. Monitor and Critique Visual Performance: During assessment as well as instruction, observe the student's natural head and eye movements from different positions to obtain the information necessary to provide accurate feedback. The O&M therapist may notice, for example, that the student looks down on the ground most of the time while traveling, even when using a long cane. In that case, instruction to encourage systematic scanning will be necessary, once trust in the cane and an effective cane technique are achieved.

Visual preview of the environment involves actively scanning for landmarks and objects, which implies that students need to have some idea of what to expect in different environments and where these objects are usually located ahead of time. Photo libraries of common environmental objects can be very helpful in this area. In addition to existing ones, an O&M Photo Library can be developed to specifically address concepts associated with mobility. The O&M Photo Library may include enlarged, laminated, color photos of common environmental objects such as a parking meter, mailbox, fire hydrant, stop sign, traffic light, and crosswalk lines. It is more cost effective nowadays to digitally enlarge and laminate prints at copy centers rather than having it done through film negatives. We have an example of an O&M Photo Library for you to look at.

It is important to insure that the previously mentioned visual preview skills, such as blur interpretation and visual closure are also applied in unfamiliar settings for transferability purposes. The selection of unfamiliar environments will vary from one student to the next. In general, it can be determined by considering what the child's non-disabled peers are doing from an independent travel standpoint, and gearing instruction toward this goal.

We have already discussed issues regarding assessment and instruction. Now, you may be wondering how we judge when a particular student has achieved his or her level of optimal visual efficiency. Answering the following questions may be helpful:

a) Does the student have a good conceptual understanding of the environment at large?
b) When using a long cane, is vision now freed from looking down toward the ground for the most part, and made available to scan more of the environment?
c) Is the student proficient in using the optical device(s) for mobility purposes?
d) Is the student able to generalize and transfer visual concepts to unfamiliar environments?
e) Does the student implement appropriate strategies for optimizing visual efficiency, such as wearing sunglasses or visors?
f) When experiencing reduced visual functioning, does the student compensate by relying on other senses?
g) Is the student incorporating visual information available to him or her, to enhance orientation, make good decisions and problem-solve effectively?

In summary, when the O&M therapist has a good understanding of what visual skills a student needs to develop or refine, and a sound plan for promoting visual efficiency, the student is more likely to succeed.

EMERGENCY LIGHTING AND WAYGUIDANCE SYSTEMS

K T BRIGHT, M S WRIGHT, G K COOK
The Research Group for Non-Handicapping Environments,
The University of Reading, UK

BACKGROUND TO THE RESEARCH

In the United Kingdom there are estimated to be one million people with some form of visual impairment. However there has been little research carried out to find how to make buildings suitable for the whole community rather than just well sighted people. To tackle one of the possible design flaws of public access buildings it was decided by the Research Group for Non-Handicapping Environments at The University of Reading, to study the provision of emergency lighting in buildings. The study and tests, which took place at the Building Research Establishment (BRE), were also prompted by the fact that there are a range of new lighting systems commercially available that use a different approach to that provided by the standard emergency lighting system. These systems known as wayguidance provision mark the emergency exit route, using low mounted markings, rather than by lighting the entire building space with high mounted luminaires.

A recent survey [1] in Northern Ireland details the numbers of disabled people who are using public access buildings. After obtaining data from over 28,000 private households and 265 communal establishments in Northern Ireland the survey records that the number of people with vision problems who leave their residences as a percentage of the total mobile population of Northern Ireland is 2.98%. Of this total 2.08% go out unassisted, and 0.9% go out with assistance. It is the needs of this large population that this paper particularly addresses. In addition the results of a study of nine emergency escape route lighting systems, using opinions and walking speeds from 60 visually impaired people with a wide range of visual impairments, are presented.

A DESCRIPTION OF THE TEST FACILITY

The study used the same BRE test facility as was used for normally sighted people. The test route is over 28 yards long, starting in an office, proceeding though a door onto a short landing, turning down a flight of stairs, and along two sections of a corridor to an emergency exit door. Of the nine lighting systems, three used conventional overhead luminaires, providing a minimum illuminance level exceeding that called for by British Standard. BS 5266, [2], requires a minimum of 0.2 lux of illumination along the centre line of an emergency escape route, whereas the minimum tested in this study was 0.7 lux. There were four powered wayguidance systems, which used electroluminescent strips, miniature incandescent bulbs or LEDs to provide the light. There was one unpowered wayguidance system, which used low cost photoluminescent strips to provide a low level of illuminance. Finally a combination system was looked at, which used LED wayguidance with overhead lighting. A more complete report of the findings is to be found in [3].

FINDINGS FOR EMERGENCY LIGHTING

For people with poor vision it is found that overhead emergency lighting systems that provide more than the 0.2 lux of illuminance suggested by the British Standard are preferred. People found it easier to see where to go under the brighter overhead emergency lighting system.

Other features that should be considered when designing an overhead lighting system are;

- The placement of luminaires should be out of people's direct line of sight, so that they do not cause glare whilst providing illumination.
- The lighting should be as even as possible. This is because alternating bands of light and dark cause adaptation problems for people.
- Because the lighting does not pick out the escape route, merely illuminates the building fabric to give the visual clues required, it is important that the building fabric provides enough contrast to help people with poor vision. The most important features that should be contrasted are stair nosings, doorways and other turnings along the escape route.

FINDINGS FOR POWERED WAYGUIDANCE PROVISION

The results for wall mounted marking lines for visually impaired people generally follow the suggestions for normally sighted people [4], bearing in mind the following points:

- A clear illuminated sign above the exit door is useful for people to aim at.
- Signs should be large enough so that they are recognisable from a reasonable distance. Signs that are meant to be understood from a long distance, such as those on an exit door, should be at least 6 inches in height. Signs can be more difficult to understand if they are composed of discrete lights rather than a stencil on a light source.
- Because people with poor vision have difficulty seeing and understanding scenes it is necessary to make escape route lighting as simple and clear as possible. It is not the case that the more information available the better the system as people have to find the useful information amongst all the distractions.
- Although only having low mounted tracks on one side of a corridor less than 6 feet wide is cheaper, it is preferable to have tracks on both sides of the corridor, to outline the escape route.

FINDINGS FOR NON-POWERED PHOTOLUMINESCENT WAYGUIDANCE PROVISION

It was found that the photoluminescent tracks and signs tested in the facility were completely inadequate for people with poor vision. It was too dim, and caused people to walk significantly slower than other systems. People were more likely to become lost or disorientated.

DESIGN OVERVIEW

If walking speed is the only criterion that is used to compare the 8 powered systems it was shown that apart from the overhead lighting system that produced a minimum of 24 lux on the floor (which gave faster walking speeds under certain conditions) all other 7 systems allowed visually impaired people to walk at similar speeds. When deciding whether to install an overhead emergency lighting or a wayguidance system it should be noted that poorly sighted people preferred wayguidance systems to the basic traditional overhead lighting, even though the tested system exceeded the British Standard. Even the dimmest wayguidance provision, with a minimum of 0.1 lux on the floor along the route, was preferred to the overhead systems that

produced minimum floor illuminances at least five times as great. The system that combines wayguidance provision with overhead lighting was found to be preferred to either of the systems individually. This research has shown that the unpowered photoluminescent wayguidance strips tested in this study are too dim to be used for visually impaired people. Overhead lighting that meets the minimum recommendations of the British Standard on emergency lighting is regarded as not as good as a system that has a minimum of 2.5 lux along the centre line of a level escape route.

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BEYOND 2000: A MOBILITY ODYSSEY. BEST PRACTICES FOR FUTURE MOBILITY SERVICE DELIVERY IN QUEENSLAND, AUSTRALIA

SARAH STODART
Senior Regional Orientation and Mobility Instructor
TAHIR ALI
Principal Orientation and Mobility Instructor
Guide Dogs for the Blind Association
PO Box 50, Bald Hills 4036
Queensland, Australia

Introduction

Since the mid 1970's, mobility service delivery by the Guide Dogs for the Blind Association of Queensland (GDBAQ), Australia, has undergone a metamorphosis. This has been dictated by the changing causes of low vision and blindness, the mobility needs of the consumer group coupled with the demographics and geographical expanse of Queensland.

As vision rehabilitation therapists and services throughout the State are limited, GDBAQ's Mobility Instructors and other rehabilitation staff play a pivotal role in establishing new vision rehabilitation, welfare and recreation services in each region. Previously unrelated vision, generic and volunteer service providers are now linked and complement existing mobility services, culminating in comprehensive, community based vision services.

Outlining the metamorphosis, this paper expands on the innovations in service delivery, incorporating mobility training, that have emerged as a consequence of these issues.

Queensland's Geographic and Demographic Status

Queensland is the second biggest state in Australia and has the third highest population, numbering 3.3 million. Eighty five percent of this population is concentrated in a narrow coastal strip extending over 2000 kilometre. The capital city, Brisbane (population 1.5 million) in the far south east corner of the state and the immediate surrounding regions (population 590 000) constitute 63% of the population.

As high as 14.2% and expected to be 17.2% in 2021, the greatest growth in population is those 65 years and older. Net population gains of 44 000 per year, mainly attributable to intrastate migrant, reflects this trend. Queensland is experiencing and will continue to experience an aging population. (Australian Bureau of Statistic (ABS), 1996).

Queensland's geography and climate incorporates subtropical, tropical, bush, and desert environments. Comparatively, the cost of living in Queensland is minimal making it a very desirable place to reside.

Demographics of People with Vision Impairment
No register of people with vision impairment (VIP) is maintained in Australia or Queensland. The ABS (1993) reports that between 0.3 and 1.7% of the total population identify themselves as having a significant vision impairment. Based on a conservative 1%, it can be estimated that some 33 000 VIP reside in Queensland, mainly in the south east corner and along the eastern seaboard of the state.

Vision impairment in Queensland is, in the main, related to the aging process. A total of 5.2% in the 65-74 year age group report a vision disability, increasing to 13.6% of those over 75 years. Over 80% of VIP have at least one other disabling condition. The majority of VIP (88.3%) live in households, 11.7% live in establishments (ABS, 1993).

The major causes of vision loss are aged related maculopathy, cataracts and glaucoma (Royal Blind Society, 1996). Significant other impairments include retinitis pigmentosa, diabetic retinopathy, hemianopias and optic atrophy.

Older VIP are tending to limit their mobility to their local shopping area and often combine these trips with a social outing with family, friends or carer. More time is spent on leisure activities around the home (Royal Society Blind, 1996). Vision rehabilitation programs for the older VIP reflect this, with more emphasis on low vision, social, daily living, counseling and resource intervention. The support and identification cane, as well as the sighted guide is replacing the long cane as the primary mobility aid.

Vision Impaired Services in Queensland
More than 30 specialist vision agencies and groups are located in the capital city. The structure and size of these organisations are varied, as are the services. Most groups are private, not for profit establishments relying on bequests, donations, fund raising, volunteers and limited government funding to deliver services. In the main, services are free of charge, however, costs are incurred for the purchase of specialised equipment such as canes, low vision optometrical, technological and daily living aids.

The services include radio, mapping, braille, moon and taped communication services; recreation and sporting activities, mobility and daily living rehabilitation; transport, postage and other financial subsidies and concessions; counseling, welfare and social support; educational, vocational and employment services; low vision optometrical intervention and vision research; advocacy; accommodation; and technological services.

Outside the south east corner, the availability of specialised vision services and agencies diminish dramatically. VIP living in the major regional centres have direct access to, at the most, four agencies and groups. Typically these are services are provided by the local low vision clinics, vision impaired support groups, education department and GDBAQ regional offices.

Services of the Guide Dog for the Blind Association, Queensland (GDBAQ)
In the mid 1970's, GDBAQ mobility services were the responsibility of one instructor. Potential

long cane clients outside the south east corner were assessed during regional trips and recommended for residential training in Melbourne, sometimes as far as 4000 kilometres from their home. Follow up intervention was not an immediate nor a regular service. VIP with other needs were, simply, unable to be assisted.

Currently, there are ten practising mobility instructors in Queensland (this does not include dedicated guide dog instructors who are dually qualified), seven are employed by GDBAQ. Of the seven, two are based in the capital city, the other five are located across the state, one region encompassing half the state. Between one and three support staff are employed in each region, providing administration and/or resource assistance. In 1989, GDBAQ provided 1175 programs, growing to 2219 programs in 1997.

Due to other vision services in the capital, GDBAQ client services are limited to support groups, mobility training and counseling. GDBAQ residential centre in Brisbane is utilised for more intense and complex programs with domiciliary after care and follow up. GDBAQ Mobility Instructors also provide limited mobility services to VIP children to supplement the work of three Education Department mobility instructors.

Service intervention outside the capital is more diverse. The mobility instructor is often the only vision rehabilitation specialist within the regional service area. There is an onus and expectation to identify and meet the client's needs. Most VIP are referred to GDBAQ due to the expertise, high profile and long establishment time of the Association in the regions and the lack of other specialised vision services. As a result, extended travel and service innovation to meet the needs of the VIP are the norm for all regional GDBAQ staff. These innovations also reflect the expertise and resourcefulness of the staff.

Service Innovations by GDBAQ Staff in Queensland

Low Vision Clinics

A common innovation to all regions, in which GDBAQ staff have played a pivotal role, has been the establishment of low vision clinics. In 1983 only one clinic existed in regional Queensland. In 1998, six clinics now exist with another clinic commencing later this year. Lions clubs have provided the financial support for most clinics.

Optometrists, social workers, occupational therapists and mobility instructors volunteer their services. As mobility instructors have experience and knowledge of vision impairment, their input to the establishment, service delivery and administration of the clinic has been crucial.

Low vision clinics provide a holistic service by a greater range of professionals, thereby identifying and assisting more VIP. As a result, the mobility instructor's time is better utilised on mobility intervention.

Support Groups

GDBAQ staff are also associated with the establishment and coordination of some 25 VIP support groups throughout Queensland. Every group provides a mixture of peer support, social, recreational and educational interaction. These groups provide opportunities for the

VIP to approach GDBAQ staff with individual requests for intervention, often which can be resolved during the meeting.

Telelink groups assist isolated VIP to share common experiences as does the Telelink group for those with monocular vision. One group aims to create greater employment opportunities for younger VIP, while another enterprising group of VIP have public displays of their art work. These groups are all supported by GDBAQ staff.

Assessment Centres
Some regions have established assessment centres, greatly reducing administration, assessment and travelling time and proving most successful for resource intervention and limited support and identification cane training for the VIP. On average an extra two people can be assisted in one day. These centres coexist with home based assessments and domiciliary intervention.

Remote Regions and Isolated Groups
Culturally appropriate mobility and resource intervention is continually been designed with indigenous health workers to ensure the needs of Aboriginal and Torres Strait Islander VIP are met either by the health worker or the mobility instructor.

Regional community and commercial radio stations have responded to approaches by GDBAQ staff, resulting in the establishment of a newspaper reading service and participation in a talkback program on disabilities.

Educational Workshops
GDBAQ staff utilise practical educational workshops on vision loss to empower aged care workers, employment personnel, carers, families, volunteers, student nurses, therapy students and other professionals. It has enabled these people to correctly identify VIP requiring extended mobility intervention, as well as giving them skills to assist VIP in daily living, recreational, vocational and mobility activities. An invaluable educational tool for people working in remote areas where GDBAQ staff may only visit once a year.

Liaison with Universities and Other Community Groups
Lecturing at and liaison with universities and other tertiary institutions has resulted in student placement with GDBAQ and the development and completion of various research projects. These include the establishment of support groups, resource file outlining vision impaired student's needs as well as a student designed and produced taped newsletter. The taped newsletter project is supported by Rotary Clubs.

Advocacy, Access & Disability Committees
Serving on committees, including local city council reference access groups, aging and disabilities groups, GDBAQ staff have contributed to the development of policy and the implementation of facilities and services which facilitate independent access for VIP.

Mobility Instructors' Course

While long cane and traditional orientation and mobility skills are fundamental in a vision rehabilitation program, this year's inaugural Mobility Course conducted by GDBAQ, as a part of a Graduate Diploma of Human Services, incorporates low vision, daily living, counseling, access and communication theoretical and practical components of vision rehabilitation. Analysing the changing needs of VIP and the current tasks undertaken by GDBAQ staff, in particular mobility instructors, the course is designed to produce multiskilled mobility specialists, competent in the many aspects of vision rehabilitation.

Conclusion

GDBAQ is committed to develop and provide comprehensive services for VIP. Staff are encouraged to be creative with the content and delivery of services which best utilise their skills, expertise, resourcefulness and time and those of other people and services.

Queensland's vastness and limited resources have not had a negative impact on vision services, but will continue to result in original and innovative solutions. It is envisaged that current practices will be the foundation for best practices that incorporate mobility service delivery for VIP in Queensland into the 21st Century.

SENSORY LEARNING: A FRAMEWORK OF EARLY O&M SKILL DEVELOPMENT

TANNI L. ANTHONY, ED.S.
Colorado Department of Education
201 East Colfax Avenue
Denver, Colorado 80203

The avenues of learning are one's sensory modalities. This is true for all individuals, but is a critical concept for the very young child. Beginning at birth, the infant works diligently to organize available sensory information. During the first year of life the young child learns the meaning of a multitude of touches, movements, sounds, and visual images. Organization of sensory information gives predictability and meaning to the child's environment. As such, it offers a platform for the child to build and refine purposeful movement and investigation of his environment.

When an infant is born with visual impairment, sensory organization may be challenged by both internal and external factors (Anthony, 1996). Prematurity, for example, is often accompanied by other medical conditions and prolonged hospitalizations. Even under optimal circumstances, the young child with visual impairment is challenged to decode and appreciate an abundance of sensory information.

Individualized and systematic attention to the child's sensory needs and preferences can greatly assist with encouraging the infant's comfort and competency of voluntary movement and exploration. The traditional functional vision assessment only completes part of the picture. Further assessment is needed to fully ascertain the child's sensory capacity, needs, and learning style.

The work of Koenig and Holbrook (1995) on learning media assessment helps to expand the information typically gathered from a functional vision assessment. While the *Use of Sensory Channel* form in their 1995 text was designed as a pre-literacy tool, it also serves as a useful vehicle for early orientation and mobility programming. The purpose of the form to acquire information about the child's reactions to sensory information.

The observed behavior of the child is coded according to the type of sensory stimuli inherent to the particular task. If the child reaches for a toy based on its visual presence, the behavior is recorded as visual. If the child turns to the sound of a toy behind him, however, the behavior is coded as auditory. The form can be completed in a variety of environments and by more than one team members including parents. The goal is to build a perspective of what senses appear to dominate the child's attention and interaction with people and objects.

In addition to the *Sensory Channels* form, an Individual Learning Profile checklist can be used to provide additional information about the child's sensory responsiveness. Information as to

the specific characteristics of the preferred sensory mode(s) are examined in further detail with this instrument. Positioning, lighting, color, contrast, pitch, timing, spacing, etc. needs are noted which paint a richer picture of the child's learning style.

Information from both tools can greatly assist the Orientation and Mobility instructor with identifying: (a) an approach style to work with the child; (b) environmental supports to facilitate further sensory, cognitive, and physical learning; and (c) movement motivators and supports for the child. A full perspective of the child's learning style abilities will offer an underlying structure to the goals and objectives of an early O&M program.

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MOBILITY AND LOW VISION DEVICES: HELP OR HINDRANCE

RICKILYN M. MANCIL, MA, COMS
Department of Veterans Affairs
Vision Rehabilitation Research Laboratory; Salisbury, NC

INTRODUCTION

Success in mobility for the visually impaired individual is and should always be defined as traveling in the safest and most efficient manner possible. Because the vast majority of visually impaired individuals retain vision, working with the vision is vitally important. Most low vision (LV) people insist on using that vision, and sometimes maintain the belief that the vision is useful when it may not be so. Since LV services are now more widely available than ever before, the orientation and mobility (O&M) specialist is more likely to work with individuals who have devices prescribed to them. Therefore, O&M specialists must understand LV devices and be able to assist the LV individual in sorting through the positive and negative aspects of the devices. Going through this learning process, even if it results in discontinuation of LV devices, will assist the visually impaired individual in: (1) understanding the remaining vision and its potential; (2) learning when to use LV devices and in which settings they will achieve the most benefit; and (3) developing the skills to attain the highest degree of travel success.

HISTORICAL BACKGROUND

Although written record of mobility training can be found as early as 1872 (Levy) where publications in England indicated some systematic use of the cane for travel, there is no mention of LV and its relationship to mobility until nearly 100 years later. The first recorded, formalized mobility instruction was provided to children in Germany, possibly as early as 1910 (Allen, 1969). The Germans were also among the first in training dogs to guide their blinded veterans after the First World War (Hwitstock, Franck & Haneline, 1997). As Allen (1969) so eloquently stated, "advanced methods and tools of today are but the resultants of much past thinking..." Therefore, these and other past contributions from around the world have all helped in the development of formalized O&M instruction with the long cane. This began in 1944 at Valley Forge, PA in the United States with a systematized method of teaching totally blind veterans to move about safely and efficiently (Blasch, Wiener & Welsh, 1997). In the 1950's, responsibility of rehabilitating blinded veterans was transferred from the Armed Services to the Veterans Administration. The main goal of this rehabilitation continued to be the instruction in O&M for blinded veterans (Bledsoe, 1980) and a continued refinement of the methods developed at Valley Forge. Still, there is no indication that use of remaining vision was emphasized. It was not until 1960 that the first university level, graduate course in mobility was offered at Boston College, and finally in 1967 the first LV clinic was established in cooperation with a graduate mobility curriculum (Welsh & Blasch, 1987). During the 1970's, the importance of considering remaining vision of visually impaired individuals became obvious to the professionals. In 1971, the first national LV mobility conference was held and in 1972 a LV course became a requirement for graduation from Western Michigan University's O&M program. During this decade in other countries O&M was quickly becoming a formalized training method for visually impaired individuals (Neustadt-Noy & La Grow, 1997) and numerous arti-

cles were being published on the topic of O&M and its relationship to and with LV (Geruschat & Smith, 1997, p 62). Today, most university training programs incorporate LV into their mobility programs. About 1983, Pennsylvania College of Optometry (PCO) was the first and is the only US university program that developed a Masters degree in LV therapy. PCO continues to graduate LV therapy specialists. This program, even though it specializes in LV, also has a mobility component, thereby emphasizing the fact that LV and mobility do, in fact, go hand-in-hand.

According to Geruschat & Smith (1997, p. 60), "blind mobility is fundamentally different from sighted mobility." The senses a totally blind individual uses to travel, primarily that of touch and sound, are quite adequate for safe travel. But these senses provide no preview of the environment to prepare for upcoming situations. Therefore, a totally blind traveler using a long cane is often slower and has the expectation of coming in contact with obstacles or situations which cannot be detected in advance. Traveling with LV would seem to be faster, but would it be safer? The LV traveler, especially one with severe visual impairment and/or fluctuations in vision needs several methods for collecting information. The composite of visual information may be inaccurate, and often the traveler must assimilate tactile and auditory information to refine visual clues into reliable data. LV devices used to augment this impaired visual information may provide more information in some ways and less in others. To predict productive usage of LV devices, it is important to fully understand the optics of the devices, the functional usage applications and the individual traveler preparing to learn to use the devices.

MOBILITY AND VISION INCLUSION/EXCLUSION

Mobility problems unique to the LV population are almost exclusively related to changing in lighting conditions and glare. Other problems experienced by virtually all visually impaired individuals include detecting changes in terrain and depth, avoiding unwanted contacts, negotiating street crossings, and having insufficient auditory and tactile information for decision making (Geruschat & Smith, 1997). Tactile and auditory cues are most often associated with learning to deal with these later environmental challenges, but LV can add yet another dimension to travel.

Because the profession of O&M in the US grew primarily as a tactile (long cane) method to rehabilitate World War II totally blinded veterans, remaining vision was not integrated. Blindfolds were often used to occlude any remaining vision so that tactile and auditory skills could be better sharpened and vision would not compromise the development of these necessary skills. Many instructors today still believe that blindfolds are an important part of the formal O&M program and that they not only sharpen auditory and tactile skills, but also improve self confidence and simulate nighttime or dimly shadowed travel situations. In the 1970's with the growing attention to LV (i.e. publications, the first national LV mobility conference, etc.) opinions began to change. Results from Smith's 1976 survey of O&M specialists showed during that time that 50% of the O&M specialists believed in and used blindfolds and 50% did not. In a later survey, also conducted by Smith (1990), the results showed an increased swing in the trend to use remaining vision (70%) and not blindfolds (30%). Although there are purists at both ends of the spectrum, those who believe in total occlusion of remaining vision and those who believe in total inclusion of remaining vision, there are also those in

the middle who believe that sharpening of cane skills can be done by occluding the bottom half of the vision and continuing to use the upper half to reinforce visual skills while traveling. Yet others subscribe to a combined effort, using the blindfold to enhance skills, then weaving the visual skills into the program for a totally integrated method of travel. To date, there is no objective evaluation method to determine which method is best. According to Geruschat & Smith (1997, p 99) "the student who is trained in a combined use of sensory input is the student who will be better equipped to deal with all functioning senses."

MULTIDISCIPLINARY/MULTISENSORY APPROACH

People with LV are so very, very different. Their personalities are different, their cognitive abilities are different. Their preferences, interests and enthusiasm vary greatly. And of course, their vision is different. The vision differences can be broken into two functional categories and each can then be divided into a mild through severe range. All these variations make it very difficult to make global statements about this population. For the purposes of this paper, we will categorize the population into: (1) people with decreased visual acuity who have full fields of view; and (2) those with restricted visual field problems and generally clear visual acuities.

Usually people with vision loss have been to an eye care professional long before meeting with an O&M specialist. They have been diagnosed with a disease and it has usually been determined that the disease is not correctable. Many have been told they were "blind" and "nothing more can be done" and have almost lost hope. An O&M specialist can help ease the anxiety by discussing possible options while assessing needs and functional vision in the real world. A referral to an eye care professional who specializes in LV is appropriate at this point, with a report on those basic needs and the findings of the functional O&M evaluation. The O&M specialist should communicate closely with the eye care professional regarding use of the devices prescribed in the real world. A close working relationship among both professionals will provide opportunities to fine tune the prescribed devices. An eye care professional might prescribe any or all of the following devices to an individual for general purposes: long term reading devices (magnifying devices); TV or sports watching spectacles (monoculars on frames); reading illumination devices (lamps); and indoor glare control tinted glasses. For mobility purposes, an eye care professional might prescribe: sunglasses for glare protection; pocket magnifiers for portable spot reading needs; monoculars or binoculars for distance reading; reverse telescopes or prisms for field enhancement; and night vision devices. Eccentric viewing and scanning techniques could both help with general mobility and with low vision device usage.

VISUAL IMPAIRMENT AND MOBILITY LOW VISION DEVICES

Those individuals with **decreased visual acuity** usually maintain their full fields of vision. The most common disease resulting in these symptoms is Age Related Macular Degeneration. These people have less problems traveling and may often be seen without a long cane. They may use the cane for identification more often than for protection, especially those with mild impairment.

Those individuals with **decreased fields of vision**, usually caused by glaucoma or retinitis pigmentosa (RP), often experience increased mobility related problems. These people use a long cane for safety almost exclusively, particularly in the advanced cases.

Mobility low vision devices and techniques usually prescribed for these two types of visual impairment can be found in the table at the end of this paper.

TRAINING STRATEGIES OF LOW VISION DEVICES

For the purposes of this paper, there are a few misconceptions about LV devices that need to be explained to a individual prior to use or the chance of failure will be increased. For specific training methods, many references are available, some of which are listed with the references at the end of the paper.

Illumination Control Devices (sunglasses):

Misconception "The sun hurts my eyes; therefore the darkest pair of sunglasses I can find will be the best."

Truth The primary objective when using sunglasses is to reduce the glare while maintaining the highest light level. Since we all need light to see, choosing the darkest pair of sunglasses will decrease the available light and make it more difficult to see.

Magnification Devices (magnifiers, monoculars):

Misconception "I have trouble seeing and want the biggest magnifier I can find because the bigger the magnifier, the more power it has."

Truth
- lens diameter decreases in size as power increases, thereby decreasing the visual field and making it more difficult to see a full word at one time
- the higher the power, the smaller the distance of the magnifier to the reading material (focal distance)
- this focal distance becomes more critically exact as the power increases, making it difficult to read anything if the depth of field is not kept constant

Misconception "I can't drive anymore, but if I could see further away, I would enjoy riding as a passenger. Maybe a monocular would help."

Truth As a magnification device increases size of objects, it also increases motion. Therefore using a monocular while moving will not be productive or enjoyable.

SUMMARY

Ask people who have LV if they are blind, and they will almost always state emphatically that they are not! Ask them what lengths they will go to regain their vision and you will be surprised by their initiative. Almost all visually impaired people with any degree of remaining vision will cling to that vision and try to use it to the utmost. The job of the O&M specialist should be to help these people understand the vision they have, teach them to be able to use it efficiently in a variety of situations, and teach them to augment their vision with tactile and auditory clues. It's not an easy job. But an O&M specialist who has a good working knowledge of LV and optics may be the best person to accomplish this feat. An O&M specialist can transport the visually impaired individual to a variety of environments and during different

times of the day or weather conditions when possible success or failure of a device might be evident. No other occupation has this flexibility. Extensive experience in these settings will help the individual to understand the available vision and the options with and without LV devices. Success then, is and should always be defined as traveling in the most efficient manner for that individual, which may or may not include LV devices for the person with decreased visual impairment. Attempting to use a LV device should be viewed as a learning experience to help the individual learn more about their potentials in all realms.

Table

DECREASED VISUAL ACUITY	DECREASED VISUAL FIELDS
Helpful Training Technique	**Helpful Training Technique**
Eccentric Viewing	Scanning
Low Vision Devices	**Low Vision Devices**
Sunglasses for glare protection	Sunglasses for glare and light adaptation
Pocket Magnifier for portable spot reading	Pocket Magnifier or monocular*
Distance Vision Device (monocular)	Fresnel Prisms or Reverse Telescope for field enhancement
	night vision device

* This population may need magnification for near or distance vision reading tasks, but if the central vision is unimpaired, this type of device will be more detrimental than helpful. A magnified image in an already small field of view will make an object larger than the field of view, thereby making it impossible to recognize without scanning pieces and putting it together through memory.

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COLOUR SELECTION AND VISUAL IMPAIRMENT-DESIGN GUIDANCE FOR INTERNAL BUILT ENVIRONMENTS

KEITH BRIGHT*, GEOFF COOK* AND JOHN HARRIS°
* Department of Construction Management & Engineering,
° Department of Psychology,
The University or Reading, UK.

INTRODUCTION

This paper describes the development of the colour contrast design guidance developed as part of Project Rainbow [1], a two year project completed in June 1997. In total, the Project involved undertaking a questionnaire to establish the problems visually impaired people have when using the built environment and the strategies they adopt when doing so, together with a series of tests to establish the minimum colour/tone contrast perceptible by a representative sample of visually impaired people [2]

The Colour Contrast Perception Tests

In setting the original objectives of Project Rainbow, it was considered that the scope of the research should not concentrate on the way visually impaired people actually perceive colour, but more on the practical outcome of determining their underlying ability to perceive contrast between two colours. This contrast may be brought about by a person's ability to see contrast of the true colours, contrasts which are variations in those colours (caused by a visual impairment) or contrast seen within a grey scale. From marketing data supplied from one of the industrial partners to the project, ICI Paints, four representative colours from different areas of colour space were chosen for use in colour perception tests. These were, in terms of their classification in the Natural Colour System (NCS) Y50R, Y90B, R80B, and G50Y. For these colours, perception tests were carried out along the chromatic intensity scale and the blackness/whiteness scale of individual colour pages. Perception tests of adjacent colour cards were also undertaken to see in changes in hue could be discriminated. Other perception tests using the four chromatic psychological colours (yellow, red, blue and green) and the achromatic colours (black and white in terms of the grey scale) were also carried out.

Test Equipment

A number of standard colours were used to provide the basis for systematic comparisons. Those colours were viewed by visually impaired subjects within a controlled environment, where the overall background illuminance and the luminance of the test stimuli was standardised. The test apparatus comprised a purpose built, controlled viewing chamber painted internally and externally in a neutral, flint grey background of colour notation R64B in matt finish. In this way the possibility of glare was reduced and an even distribution of background luminance within the chamber was ensured. An illuminance of 100 lux on the viewing plane was provided by an overhead D65 florescent tube, the illuminance level being determined by the defined areas of interest; circulation routes within public access buildings where the Chartered Institute of Building Services Engineers (UK) recommend an illuminance of 100 lux. The internal dimensions of the viewing chamber were 1m long x 0.85m wide x 1m high.

Test Stimuli

The criteria for selection of colours were as follows:

- the colours chosen should be widely used in buildings,
- they should reflect current design practice in the selection of colour schemes,
- they should sample colour space in a reasonably systematic way, to allow extrapolation of the results.

It was decided that, given the constraints imposed by the time-scale of the project and the characteristics of the experimental observers, the number of colours chosen for study must allow completion of testing within a reasonable time. From each of the 4 pages of the NCS colour atlas described earlier, one nuance was selected on the basis of ICI Dulux data, as representing a popular wall colouring from that region of colour space. These nuances were: 0010Y50R, 0010Y90R, 0010R80B, and 0010G50Y.

Other colour swatches were selected to allow tests of discrimination from these 'standard' colours along the whiteness/chromatic intensity axis (including a comparison with white), and the whiteness/blackness axis. As current design practice may involve the selection of 'warm' and 'cool' harmonies , or of contrasts, to a particular colour, other swatches were selected to determine how different along its chromaticity axis such a warm or cool harmonic or a contrasting colour would have to be in order for it to be discriminable from its 'standard' colour. To increase the generality of the results, the most saturated nuance of each of the selected colours was compared with its horizontal neighbours in colour space, varying both in chromatic intensity and blackness. Finally, the ability to make purely achromatic (grey-scale) discriminations from white (0000N) and black (7000N) was measured. 29 sets of colour swatches were assembled for the various tests, giving a total of 278 possible comparisons.

The test stimuli consisted of the chosen, non luminous colour swatches, 15 cm x 15 cm presented to the viewer at a distance of approx. 72 cm, and at a 45^{o} angle of slope.

Test Procedure

As mentioned earlier, an important aim of the tests was not to try to estimate how particular colours appeared to visually impaired observers, but rather to establish how different, along various dimensions, two colours had to be to allow confident discrimination. The basic method was to present the observer with a pair of colour swatches, side by side and touching, and to ask for two responses. Participants were asked to say whether the swatches were the same or different, and secondly, what their confidence in that judgement was, on a scale of 1-5, (5 being 'completely confident', and 1 'very uncertain'). Each pair of colours was presented for 20 seconds, after which time the observer was encouraged to respond, though they were free to give a response earlier, if they wished. Between each presentation, the rear of the stimulus holder presented the subject with the same neutral grey as the rest of the viewing chamber for a period of 20 seconds. This inter-trial interval was intended to allow any after-images to fade and to keep the adaptation level constant for the start of each presentation.

To offer a reasonable compromise between speed and accuracy, the stimuli on each presentation was selected according to a staircase method. For each of the 29 tests, a 'standard'

swatch always appeared on each presentation, though the side of the stimulus holder (left or right) on which it appeared was randomly selected by the researcher conducting the test. On about a third of the presentations, randomly interspersed with the presentations on which the stimuli were different, the two swatches were physically identical. The observers were aware that such 'catch trials' would occur. They were intended to detect a high rate of 'false positives' (incorrectly reporting that stimuli were different) in any of the observers, and to check that reports of different were based on difference between the two colour swatches, rather than between the swatches and the surround. In practice, false positives were rare and usually made with a low level of confidence.

After the discrimination threshold on a particular test had been determined, the observer was presented with the 'standard' colour on that test and asked to name it. This provided a further indication of any regions of colour space which caused difficulties for particular observers. Testing an individual observer occupied a total of about 3 hours, and in some cases was completed in 2 sessions on separate days.

The Test Sample

It was originally planned that 40 participants would take part in the tests with 10 being drawn from each of the visual impairment groups namely central, peripheral and general/sporadic loss as identified by the research team [2]. 10 fully sighted subjects were also tested. Fully sighted subjects were considered essential to address the objective of Project Rainbow described earlier namely, that any findings must not ignore the fully sighted population. During the tests it became clear that the consistent performance of the first seven fully sighted subjects negated the need to complete the proposed number in that group but one further visually impaired subject was tested (See Table 1)

Table 1 - Visual Field Loss [1]			
Field Loss	**Total Number**	**Males**	**Females**
Central loss	11	3	8
Peripheral loss	8	4	4
General/sporadic loss	12	3	9
Fully sighted	7	3	4

Table 2 - Age Range and Gender Mix			
Age Range (years)	**Total Number**	**Males**	**Females**
18 to 25	3	1	2
26 to 35	3	2	1
36 to 45	7	2	5
46 to 55	4	1	3
56 to 65	8	2	6
66 to 75	7	2	5
76 +	6	1	5

It was decided to discard the data of one visually impaired subject because a high rate of false positives was produced. In addition, another visually impaired observer did not return for the second test session. Thus, 36 of the 38 subjects completed the experiment satisfactorily, and their data were entered into the analysis. Details of Age Range and gender are shown in Table 2.

The Analysis and Findings of the Laboratory Tests

The findings of the laboratory responses, approximately 12,500 items of information were analysed by ICI Dulux with assistance from The University of Reading. The analysis was carried out by recording the individual responses and the level of confidence for each participant in the tests. The responses were then translated into individual colour differences and the median response from each visually impaired group (based on visual field loss described earlier) for the colour tests was determined. This was used to define the appropriate colour thresholds that would effectively allow the majority of the visually impaired participants to be confident, in the existence of a colour or luminance contrast. Analysis of the data has resulted in the preparation of some 300 comparative selection tables which are included in the final Design Guide [3]. Instructions on the use of the tables in selecting colour schemes were also developed.

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THE INCLUSION OF THE O & M SPECIALIST IN THE LOW VISION DRIVER EDUCATION AND ASSESSMENT PROCESS

CHUCK HUSS
West Virginia Division of Rehabilitation Services
West Virginia Rehabilitation Center
P. O. Box 1004
Institute, West Virginia 25112

Within the past two decades, a number of states have relaxed or amended their vision standards for driver licensure. This change has afforded many visually challenged persons an opportunity to demonstrate their functional competencies to operate a motor vehicle.

However, in many of these cases, visually challenged individuals have not been able to obtain driver licenses because they have not adequately prepared themselves conceptually or experientially to handle all of the rigors involved in the dynamics of the driving task. In essence, pre-driver readiness skills have been lacking or underdeveloped. The O & M Specialist with appropriate training can play an important role in assisting such persons in overcoming these environmental awareness limitations.

This presentation will take a look at some of the prerequisites needed and major roles assumed by O & M Specialists who become involved in the screening, training and assessment process of those visually challenged persons who wish to explore the driving privilege.

Some of those prerequisites to be addressed will include:

1. Reviewing one's state's rules and regulations regarding vision standards and driving;

2. Enhancing one's knowledge of the concepts of visual acuity and visual field and their importance to the driving task (s);

3. Reviewing one's state's driver's manual (especially regarding pavement markings, road signs, and road laws);

4. Learning how to operate audio-visual equipment correctly and independently;

5. Accessing and previewing audio-visual driver education training materials (IPDE process, defensive driving skills, safe space-cushion driving principles, etc.);

6. Reviewing one's college notes regarding the anatomy, physiology, and pathology of the eye;

7. Becoming familiar with and able to recognize pre-driver readiness amongst your assigned students;

8. Becoming knowledgeable regarding various types, styles, and powers of bioptic telescopic lens systems (including the correct use and areas of concern of these systems);

9. Being aware that no two individuals with the same visual disorder will function the same nor interpret the world around them, including the dynamic driving environment(s), the same;

10. Obtaining formalized driver evaluator training which incorporates standardized methods for observing, evaluating, and rating the driving performance of students;

11. Observing first hand the differences and similarities of the driver performance(s) of normally sighted versus visually challenged driver education students/clients;

12. Knowing your opposition and attempting to resolve differences on issues without litigation and/or legislation;

13. Becoming a "GOOD LISTENER"!

Some of the major roles to be discussed will include reference to that of:

■ Researcher	■ Information & referral source person
■ Project Coordinator	■ Environment awareness trainer
■ Initial Screener	■ Driver performance evaluator
■ In-service provider	■ Legislative writer
■ Author / writer	■ Expert witness & client advocate

Information shared will be based on the actual experiences of this presenter who participated as one of the multidisciplinary staff involved in the Low Vision Driving Study conducted at the West Virginia Rehabilitation Center, Institute, West Virginia, between 1985 and 1995.

Sunday, July 5 morning

"SIR, WHEN DO YOU START TEACHING?"

ERIK ØSTERGAARD
The Institute for the Blind and Partially Sighted
Rymarksvej 1, 2900 Hellerup
Denmark

Long time ago I had a job in Africa. I was supposed - among other good things - to introduce O&M into the training of educators of the blind. I had not given many thoughts to the reasons for that. It was - at that time - obvious to me that the ability to move freely was of the same importance to the local blind people there as it was to the people in my own country. The methods, I presumed, would - with a few modifications - be similar to the ones I had utilised back home. Hill & Ponder`s "Blue book" was my ammunition. Sticking to that, I was certain that nothing could go wrong!

Never have I been better prepared for O&M lessons than in my first weeks there. As an appetiser I spoke enthusiastically about the philosophy of gaining independence, I explained methods, I described the benefits of long canes, and I tried to the best of my knowledge to get my students to feel the importance of independent travel. I sat on my desk, I moved around, and I talked - and talked - and talked.

The students, however, showed no significant reactions to my words of wisdom. After a couple of weeks a student raised his finger to ask a question. Happily I gave him my permission to ask the question in the firm belief that the ice had now been broken. " *Sir*", he said, " *when do you start teaching*?". I do not remember my answer and I do not remember how the lesson was brought to an end, but I certainly realised, that I had learned a thing or two about teaching outside my own environment.

I had committed at least 2 equally grave mistakes. The first one was that I had used a wrong way of presenting my message. A lecturer - at least at that time - simply did not behave like that, moving around, sitting on the desk, and talking without writing notes on the blackboard for the students to copy for use in a following examination. It was not considered serious to do things like that in an educational setting. So the teacher - me - was not serious, and the information and the knowledge presented were just considered small talk. My form of presentation prevented the transfer of knowledge and resulted in - - nothing!

The second mistake - and the most serious by far - was that all the contents, the examples, the arguments, the values, were from my own background and my own culture. Some of it - I

realised later - simply did not make any sense there. I had not taken the local culture, values, traditions, and attitudes into consideration.

My methods were wrong, my message was not targeted to the situation, my understanding was limited. In fact it had until then been a total waste of effort and time. The experience made me wake up and realise that my task was not as simple as I had imagined. Unfortunately the early shock was not the ultimate revelation. It was only the beginning of the process, and it certainly did not prevent further embarrassment and further blunders.

Partly recovered from my failure to provide my students with a basic understanding of O&M, I decided to devote my efforts to practical training under blindfold. The first point on the agenda was guiding techniques. My brief instruction was well received, but when I said: "Go and do it!" the discussion between my students went on for some time before the spokesman presented me with a new question: "*What do you do with women?"*. I had some different answers for that question, but having learned something from the previous confusion, we discussed the problem, and I found out, that it was not socially acceptable for a man to walk behind a woman in public and also he could not very well touch her directly. That was quite a new dimension to the concept of "touch technique"! Anyway, we managed to crack that problem, although scarves or sticks as connecting links between the guide and the blind person were not mentioned at all in "the Blue Book".

The next hurdle was the introduction of canes. We had none, except for a few symbol canes. By now my innovation skills had been boosted, so I cut a handful of bamboo in the principal`s garden, painted them white, and actually had some cheap and very well-functioning canes. There was only one problem. My students flatly refused to be seen in public with a contraption like that! In fact they did not want to be seen with any sort of cane. The compromise, after hours of discussion, was that if I succeeded in getting a "real" imported cane, they would have a go at it. By luck a sample was found, and the introduction of long cane O&M in that part of Africa was on its way.

Among the highlights in the following months was training controlled crossings - in a country where you at that time could count all the existing traffic lights on your fingers, and still have fingers left over. Orientation theory included the firm statement from the teacher that at noon the sun was in the south, although the location was several zones south of the equator. Public transport became a farce with considerable entertainment value, since my imagination had not enabled me to foresee the problems in getting my blindfolded student on the bus as passenger number 127, - at least.

Well, to cut a long story short: Nobody was - as far as I know - seriously hurt by my cultural ignorance. The students had suffered a line of the same problems with foreign lecturers during their education, so they had adapted to peculiar situations. Some of them even got an idea about orientation and mobility and what could be achieved with it. However, the existing system of education for the blind at that time did not give them much of a chance to spread the good word anyway.

I settled for that at the time. I knew that O&M according to both blue and red books was right. It took me years to start doubting that thesis. The more time I have spent with O&M - at home and abroad - the more I have learned that the basic principles are OK, but that they are lost if they are not adapted to the local conditions and situations.

My compatriot, the philosopher Søren Kirkegaard (his name might be known to the more intellectual types among you) wrote almost 200 years ago: *".. to be a teacher in the right sense is to be a learner. Instruction begins when you, the teacher, learn from the learner, put yourself in his place so you may understand what he understands and in the way he understands it, in case you have not understood it before. Or if you have understood it before, you allow him to subject you to an examination so that he may be sure that you know your part."*

Now, Søren Kirkegaard did not teach O&M, but if he had, he should not have changed many words, had he been asked to write a chapter in a "red book". He would have written that the idea of teaching was not to peddle the "correct method", but to supply the learner with whatever knowledge and skills you might have for use in that particular setting. "The correct method" is a flexible term. Basically the techniques for achieving independence as a visually impaired person do not differ much from one culture to another. The ways of implementation, however, are quite another kettle of fish.

The value of walking from point A to point B independently is not necessarily of equal importance to all visually impaired persons.
In Denmark the vast majority of adult visually impaired people live in their own flats, alone. You are in a bad situation if you cannot do your own shopping, visit other people or use public transportation. Your mobility problems are practical as well as a question of personal independence.
In southern Europe the pattern is different. Although you may find blind people living alone, it is not the common situation. The day-to-day practical mobility needs are not necessarily a question about solving practical problems. It is more a question of personal independence, the ability to do what you like, when you like, and how you like.
To be able to manage on your own is in my culture of paramount importance and is a prerequisite for integration into society. In many other cultures, especially in the 3rd world, the integration into society means to have an active role in the group, the family, or the village on the existing terms, but it does not necessarily involve being able to manage the same things as the rest of society.

The different environments, different values, and the different self-concepts of the visually impaired persons (and certainly also of the sighted), will naturally give a different reception of the set of skills that we usually understand and describe as O&M. The desirability of the condition of "Independence" is rarely questioned. However, what the instructor, the client, or the public understands by that does vary a lot according to culture.

To work with children - at least in the first stages of the training - probably does not vary much from one culture to another and young people could get the techniques after the same model in most places, but to get into the mind of the newly blind adult or perhaps old person is quite

another matter. Here it is not a question of the size of the arch or the length of the cane. It is a question of understanding the client, his way of thinking, his culture, his needs, his expectations, his prejudice, or his family`s way of thinking. That is where Kirkegaard`s words about “learning from the learner” before real instruction begins becomes of crucial importance.

A concrete skill is probably relatively straightforward for an instructor to transfer to the student with a minimum of regard for cultural differences. But O&M is only partly a concrete skill. It is - at least for the adult learner - an interference from the instructor in the learner’s personality and in the learners attitudes to his situation. The instructor can only do that with a positive result if he has a reasonable understanding of the client’s background and environment. Even if the student has achieved the very best travelling technique it is not much of a benefit to him, if he is not psychologically ready to use it. This is of course a truth in all kinds of mobility training, but it is even more of a truth, when it comes to training situations where the instructor has only had a shaky understanding of the unfamiliar surroundings. Far too often new programmes - or instructors away from their own culture - disregard the non-technical dimensions of the mobility process.

Now - when I see so many problems working trans-culturally, how come that I have been involved in O&M-training in more countries and in training of foreigners back home? The simple answer is that it has been my luck to be asked, for which I am eternally grateful. My justification for going - except for poorly selfish reasons - is that if I did not do it somebody else would - so why not me? Also, I have been so vain to believe, that once into it, I have learned a thing or two about trans-cultural work, so I would have a reasonable chance to avoid the biggest pitfalls. I also believe that I have been aware - and able to accept - that I as a foreigner would always be second best to a native with the same qualifications.

However, the history of O&M, and the way it has spread over the world, has been a success story of international cooperation. Excepting this country, all the present countries have imported O&M, and even done so within a very short span of years. The spread of O&M has been almost epidemic. We have all tried to copy and then to adapt, when we got the courage to use our own brains and not the imported ones. Results of this adaptation process have not always been spectacular. The next step in development is to get the adaptations adjusted. For that, we need international cooperation, - and a lot of it. We need to learn from each other.

Anyway, the time of the missionaries going out to save the world for O&M is luckily almost over. Most countries have already been saved. However, the time for better cooperation about ideas, techniques and provision systems is certainly not over. Foreigners will always be an important asset in the development of expertise, as providers of new ideas, as a fresh breath of air on professional courses, especially in countries of limited size like mine, where there is a constant danger of methodolodical inbreeding. But let us have in mind that what we learn from each other now, is not necessarily a new or a revised truth, it is elements of the whole picture. Whether we are able to use it fully in our own picture depends on the composition of the picture, not on the element itself. We have to learn - not to copy!

I talked to a gentleman from “my” African country not so long ago, and I happened to mention that I personally had gained much more from my stay, than I had been able to give. His answer was: “Just by being there, you helped to start the ball rolling.” It was not much of a boost for my feeling of everlasting importance, but after some consideration I was quite pleased, even proud. Is “starting the ball rolling” not the whole idea of going somewhere else?

But “playing the ball” - to stay in that picture - is up to the locals. Foreigners are - almost always - second best. They can have excellent knowledge, they can be fine technicians, they can be brilliant in theoretical matters, and they can know all the important strategies, - but they need a number of years to learn the cultural background and behaviour of the people they are supposed to work with.

It is not difficult to run an excellent course - but it is very difficult to run a relevant course. If the course is not relevant, then be sure that some clever student will surprise you with a “Sir, when do you start teaching?”.

ESTABLISHING O&M PROGRAMS IN OTHER COUNTRIES

STANLEY SUTERKO
Professor Emeritus
Western Michigan University

It always helps to know from where your presenter is coming from. His thoughts and outlook on things and what experiences influenced him. My biases in this field began to get formulated five decades ago or put another way a half-century back. I suspect that is longer than most of you here are on this earth.

In that era, one did not see many blind people walking around independently. In fact, I don't recall meeting many blind individuals. One of our neighbors down the street, had a young son whom I rarely had occasion to see because he spent the school year at the State Residential school and when he came home for the summer, he was pretty much home-bound. Those were the days when you took someone out for mobility training, the public would question why you have the blind person for a walk. In training the blind person in the residential area, we noted that after travelling the same route a few times, the home owners would be out there sweeping the few leaves and debris off our path. Trying to be helpful, saying that they did not want the blind person to trip on anything.

There were several occasions when truck drivers would pull up to the stop light and seeing the blind person waiting to cross the street, they would shout out the window at the guide: "Hey, help that blind person across the street" and if the mobility person shook his head, the driver would yell out "Help him across or I will come out there and beat the hell out of you Then the mobility instructor would remark to the client "If I have to run, you stay put and I will be back"

Back in those days, working with adolescent girls on street crossings, was also difficult. As the young lady stood at the curb, preparing to cross the street, a man drove by in his automobile and would also rage at the instructor to help her and at times even stop the car and come out to assist the young girl.

Russ Williams, describes it best, when he speaks about the mobility instructors during that era, by saying that the staff of the Blind Center were the believers who were placed in a role between two sets of doubters. One set of doubters was the society who does not expect much of blind people. The second set of doubters were the blind people themselves who came to the center and who did not expect much of themselves. Fortunately, It was this pioneering staff, indoctrinated and fully supported by Russ Williams, who believed in these techniques and teaching methods and who kept the belief alive. The success by the clients, reaffirmed and crystallized the belief in the methodology and techniques taught by the staff and thus it continued in the future. In going overseas to introduce this new mobility method, one has to be a firm and strong believer in the system as you will once again be confronted by two sets of doubters.

PLANNING FOR OVERSEAS

1. I felt it important not to go overseas as an "ugly" American, one who would loudly profess that what they are doing is wrong and as an American, I, will show them how it is done. This is the most expedient way to get yourself rejected.

2. Instead, I attempted to tell them initially that we had been doing many of the same procedures and through many errors and tribulations have discovered some ways to improve the techniques. This will be shared with them to see if it fits in their culture.

3. A common attitude I found in the countries just initiating a mobility program, was that the sighted public asks questions as to why the blind person in town is exposed to the hazards. At these times, one has to bite the tongue and attempt to explain further.
At times this is difficult to accept by the person, as they may have been contributing financially to help the poor helpless blind person and you are extolling a different philosophy.

4. Important to seek out and know the leaders or power people in the blind organizations of that community, country, etc. I would invite them to observe the trainees at different stages so they can personally observe the progress and gain some appreciation of the progress being made. This reminds me of the summer program being conducted at a residential school for the blind. After the fourth week of training, the children were sent home to transfer the mobility skills learned at school, to their home situation. The mother of this 10 year old boy accompanied us on the objective to locate the neighborhood food store. About midway there, three girls were coming toward him on the sidewalk and he promptly got off the sidewalk. After the girls passed, he stepped back on the sidewalk and continued on his assignment. At that point, I asked the mother, why did he do that? She replied that she did not know. I asked her, do you suppose he heard the girls approaching and stepped off to permit them to pass? With a quizzical look, she said: You don't believe that, do you? When we
arrived at the next street, I posed the question as to why he stepped off the sidewalk.
He looked at me with a very offended expression and said "Didn't you see the girls coming. I had to make room for them" The mother was astounded and I am sure she learned more from that one experience than I could have conveyed to her talking.

5. Seeking outdoor training areas such as residential areas. Naturally, I seek environments that lend themselves to developing certain skills such as straight line travel, down the sidewalk, approaching down curbs, street crossings etc. My secondary objective in these areas is to attempt to teach near the homes whose occupants are leaders in the community, trustees of the blind agencies, or civic organizations, town leaders, etc. Believe me, they will be very observant of your activity and hopefully, will spread the gospel.

6. As you progress to the business areas for training, look for establishments whose owners are influential people in the community. Be assured it won't take long before they pass judgment on the client's performance and you can be sure they will disseminate this information to the chamber of commerce.

7. In this same vein, it probably will not be very long before the news media will become interested in what you are doing. Just make sure, you have them get the story accurately, as they are apt to exaggerate the capabilities of the blind.

8. In the first group of trainees or students, I try to select one or two individuals who look like very promising students. They then become our best and strongest advocates for the travel system. They will certainly have a bigger impact on the acceptance of the travel training methods than what you verbalize with these one or two individuals. I attempt to spend a little more time and have them progress farther than the others. By the same token, I am sensitive and alert to those experiencing some difficulty in mastering the system and devote more time to them to gain a reasonable degree of proficiency.

9. Planning and executing a mobility program in a new setting is quite demanding. Hopefully, you have arrived at the training site well in advance of the starting date.
Accompanied by a local or knowledgeable person, one investigates the environs to acquaint oneself with the area where the training is to begin.

10. The work day then runs something like this: Mobility training, under the blindfold, is accomplished during the daylight hours. Your evenings are devoted to further scouring the neighborhoods for training sites so one can stay ahead of the group, while late evenings and weekends are spent drawing up further lesson plans. In between these planned activities, it helps to spend some time socializing with the students.

My overseas enrichment experiences began in 1965 when I was invited to the St. Dunstan's rehabilitation center in Ovingdean, England. This center is the organization that serves the war blinded of the United Kingdom. The organization serving the civilian blinded is the Royal National Institute for the Blind. Six of the blinded veterans volunteered to undertake the long cane training. As was my custom in introducing the long cane to trainees, I began in a somewhat protected environment, relatively free of many hazards and obstructions. This gives the trainee an opportunity to fully concentrate on motor skills of manipulating the cane and coordinating the cane with the feet. In the touch technique, to accomplish this, I looked for long corridors in schools, church halls, social clubs etc. An exclusive girls school, located adjacent to St. Dunstans was my answer as the students were home on vacation. The person in charge was somewhat concerned as we were to begin training that our students would be striking the walls with their canes as they traveled. I assured him that they would not, but I didn't convince him as he shadowed us for the first few days. Maybe he had some basis for feeling that way as shorelining at that time was the primary means of getting around and he informed me that the walls were recently painted

After a reasonably degree of proficiency was obtained, we moved to the St. Dunstan's Rehab Center. The long corridors were ideal for training and as was my custom, I had the trainees walking in the center of the corridor developing their coordination and timing. I was aware that we were being observed for quite a long period and at the end of the day the superintendent asked to speak to me. He said: "Don't you know that blind people can't walk down the middle of a corridor? This stumped me and without too much thought or civility I said I was not aware

of that as in the states they easily walk down the middle of a corridor. I should not have been too surprised at that remark as the mode of operations was to use a short cane 18 to 24 inches long which was used to trail alongside the wall.

One of the trainees I had, really touched me deeply when I learned of his war experiences and the circumstances of his injuries. He was totally blind, had severe bilateral hearing loss, his right arm amputated and his left hand was missing. A hand was surgically reconstructed to form a palm and a thumb which enabled him to grasp things. Bruce asked me to mention that you can see this man's photo on page 626 of his book "Foundations of O&M". Joe, the man in the photo worked hard and in spite of his disabilities learned to travel on his own from home to St. Dunstsn's. Why did I have a soft spot for him? When World War II broke out he volunteered for the Polish army. While on the front lines he was captured by the Germans, re-indoctrinated and had to fight on the German side against the British. Then was captured by the British and returned to England for retraining, and was sent again to fight against the Germans when he was severely wounded by a bomb blast. To top this off, there was some question as to whether he would be entitled to rehabilitation services and a pension. I am not sure what country is entitled to his loyalty.

On one of his mobility lessons, we took public transportation from St. Dunstan's to Joe's home. The handicapped ride free on the busses and when the conductor came to me I handed him a large coin since I hadn't mastered the English coins and did not want to be short. The conductor took my coin and collected from the other passengers and then came by to give me some change. When I got off the bus, I realized that the conductor gave me back the same amount I gave him. Apparently he was not going to charge me for the ride either.

Upon completing my relatively short stint at St. Dunstan's, I was invited to return the following year to establish the first non-residential mobility training center in the United Kingdom. This assignment was the direct result of two individuals determined to enhance the mobility of the blind in England. One was Dr. Alfred Leonard, a research-psychologist, assigned by the Medical Research Council of England to investigate and make recommendations concerning mobility. Dr. Leonard focused his attention on the United States and our efforts to provide long cane training. He then raised enough funds to enable him to visit the states and study our methods. He visited the Blind Rehabilitation Program at Hines, Illinois and the Institute of Blind Rehabilitation at Western Michigan University in Kalamazoo, Michigan. He reported his findings back in England and strongly recommended sending a blind person to the states for training.

St. Dunstan's selected and sponsored Mr. Walter Thornton, a World War II veteran who was blinded during the bombing of England. He spent one week at Hines and three weeks at Western Michigan University. He received intensive training in the mornings and afternoons, and quickly adapted the long cane, was enormously satisfied and did a fantastic job. Returning home, he gave a glowing report of the training. Many years later he even authored a book titled "Cure for Blindness" and as he told me many times, he really felt he was cured because it made him mobile and independent.

Dr. Leonard and Mr. Thornton collaborated on a proposal to the Viscount Nuffield Foundation, requesting funds to arrange for me to go to establish a non-residential mobility training center in Birmingham, England. By establishing the center as a non-residential center, there would be no competing with the National organization responsible for providing services in a residential setting.

My first blind client was a 35 year old housewife who had been totally blind for 14 years. She was an intelligent and attractive lady who had previously been employed as an executive secretary at the British Broadcasting Company. It was readily apparent that she was motivated and eager to travel independently. After becoming blinded, not once did she venture out on her own even as far as the sidewalk in front of her house. She told me that "she is sick and tired of being tethered to the house". After receiving daily training, supplemented by her own practice in the evenings, she developed into one of my star pupils. Her daily appearances in the neighborhood on strolls and shopping expeditions, with a graceful, sophisticated stroll proved to be one of the best recruiting agents for us.

About that time, the BBC decided to produce a two-hour documentary on Blindness in England. She had a major role in the second half titled "Independence" Part of her training consisted of the drop off lesson. Many people in the blind field stated that this could not be accomplished by a blind person, and this was merely the product of American publicity and advertising. The BBC learned of this activity and in making their documentary, wished to visually record the proceedings of a drop off lesson.

The housewife was selected to demonstrate this activity. The day arrived when she was met by an entourage of camera men, sound men, electricians, directors etc. They promptly affixed a portable microphone on her neckline so that anything she said was broadcast to a tape recorder outside the car. A portion of the television crew accompanied us in the car on the diversionary ride, and it did not take long for her to lose her bearings. When the car stopped to let her out , the camera and sound men got out and set up their equipment and began recording her every move. She was asked to verbalize her thoughts and feelings so these could be recorded She did a magnificent job expressing herself as to the procedure and how she was assimilating valuable information from the environment. In spite of the additional stress she put on herself, due to possible fear of failure in front of an audience recording every move and whisper, she established her starting position. As she started in the direction she assumed was the direction to her house, she kept gathering clues from her environment and kept reaffirming location enroute to her house. It has often been said "seeing is believing" but I am not sure it was applicable in this situation. In spite of the television entourage following her every step as she arrived at her destination, there were unbelievers and as they cornered her on her front porch they insisted she tell them as to when I was able to give her hints as to her location. Some days later, I was able to preview the documentary and the director of the film remarked that a million people will see this segment on TV and a million people will not believe that she is totally blind.

This documentary was also shown in Scotland and one of the directors of the largest blind center in England said to the audience that this was not possible and the episode was a fake.

Fortunately, in the audience was another trainee, a nun, Sister Barbara who spoke up and supported the episode. This happened 30 some years ago and I presume in today's enlightened age, people know that blind persons are very capable travelers.

I was fortunate to work closely with the visually impaired program at Birmingham university, which was under the direction of Ms. Williams. After speaking to her classes, I recruited seven sighted students to take the long cane training. I have some fond memories of this group of students. We used blindfolds in our training and this caused them some problems as other students, some with visual difficulties, castigated them for making fun of blindness. The most interesting student was Sister. Barbara from Scotland who, as was the custom then, wore her religious habit every day. She worked hard and diligently, however, the sighted public would frequently try to assist her. In practicing bus travel, as she proceeded to enter the bus, the conductor or some passengers would grab her by the arms and bodily lift her up the stairs. One day as she was completing a shopping expedition she was to cross a relatively busy intersection. As she was listening for traffic sounds, a car stopped and the driver proceeded to help her across. She was relieved to have crossed the street but was then embarrassed to learn from me that she stopped an entire funeral procession. Another time as she was navigating down a sidewalk, a little lady across the street began yelling at me and as a consequence Sister Barbara ran into a lamppost. The lady yelled that she was going to report me to the Bishop and I would get excommunicated. Another time, I was threatened by a sewer digger with a shovel for not assisting Sister Barbara across the area. I never realized how protective the English were of blind people, especially if they wore religious dress.

Another memory. I was working with Joan, a shy, reserved student. As she was completing an assignment, got off the bus, and crossed stop lights in two directions, she was approached by a gentleman who was a passenger on the same bus and he engaged her in conversation. Thinking that it may be an acquaintance I did not interfere. When the man left her, I approached her to question as to what the long conversation was about. She responded in a very emotional and loud voice asking "Where were you?" She informed me that the man was propositioning her and she could not get rid of him. Guess I should have strolled by to get an idea of the topic of conversation.

Another student, Mary was assigned an exercize that took her from Queen Alexandria College, walk three blocks, catch the bus to Hagley Square, cross at the traffic lights two ways, go up the street business area and locate one of the stores to make a purchase, and then reverse her travel back to the college. I asked Professor Williams at Birmingham College to observe Mary on this lesson. I could tell that Professor Williams was not comfortable following Mary and at the conclusion of the lesson asked: "Mary, does your mother know what you are doing?"

In August, 1967, I completed my assignment in establishing the Midland Mobility Center in Birmingham, England. Fortunately, Mr. Bob Crouse succeeded me and stayed on for two years more strengthening the program. It progressed to become the National Mobility Center and has had candidates from throughout the world

My second overseas assignment was to Paris, for the first European Regional Mobility Workshop. It was actually held at Marle Le Roi, just outside of Paris at a rehabilitation center founded by Dr.Chambet. We had 12 participants from 8 different countries, namely: France, Portugal, Spain, Italy, Israel, Denmark, Switzerland and Tunisia. In the classroom sessions, I of course would lecture in English and would need the services of a French translator, who would also accompany me on the outdoor travel experiences. Some of the translators were excellent and gave me a feeling of confidence in what they were conveying to the students. Other times, I was uncertain as to how the translations were being explained. For instance, when I told them to narrow the arc of the cane, the translator would talk for several minutes, seemed like a social conversation. Other times, I would speak a couple of words and she would respond with one word. This always made me wonder.

In the classroom, we always discussed the mobility exercises we were going to do before going out into the community. This one day, I started to explain to them about the drop off lesson and that we would attempt one that day. The students began raising all sorts of questions and I had the feeling we were not communicating very well and perhaps not answering questions to their satisfaction. After class, one of the students came to me and in broken english said the translator was not accurately informing the students of what I tried to convey to them. I then proceeded to inquire of the translator how she described the drop off lesson. She replied that we were going to parachute them out with their blindfolds. Why that translation, I asked? Because, she said there is no direct translation in French for “drop off” and the nearest thing is to parachute them out.

My most rewarding but at times, frustrating memorable workshop was conducted in 1979 in an Eastern Bloc country, namely, Poland. That was the period just prior to Marshall Law being established in the country. There were two previous attempts to conduct a workshop at the Laski School for the Blind, near Warsaw but the plans have been postponed by the Communist local government officials. This happened in 1977 and 1978. Finally, the third time was successful but I was notified in making my preparations that there were restrictions on items I could bring into the country. I was not able to bring in any books, mimeographed papers etc. Any printed word that I hoped to bring with me had to be submitted at least six months in advance so there would be ample time for the government authorities to censor the material. They were sensitive to any printed word that may even hint at overthrowing the government. Fortunately, I had a contact in New York who was always aware of people traveling to Poland and she arranged to have someone carry the papers I needed for the course. This made me a little uneasy, fearing that they would be stopped at customs. The next hurdle was how to get copies made for each course participant, since all copy machines were under the jurisdiction of local authorities and they were not too conducive to copying any material originating in America. Eventually, each student would arrange to type their own. copy.

The course had 13 sighted students from four residential schools and one adult rehabilitation center. Mr. Dan Nelson, an O&M instructor from Minneapolis assisted me with the mobility. Dr. Jeanne Kenmore, from the American Foundation for Overseas Blind, was an essential and valuable person in previous workshops and was responsible for completing all the arrangements for this workshop. So I assumed she would be on staff. Much to my disappointment and

shock, the Polish government did not approve her visa. Supposedly, in her previous visits to the blind school in Poland, someone decided she was anti-communism and they cancelled her visa. One of the key persons who made the course a success was Janusz Preis, my liason man. He was a psychologist at the Laski school and readily offered his help. He had the knowledge as to how best to overcome any obstacles we encountered, He was very resourceful and contributed greatly to the entire course and making my task much easier.

As usual, we began the blindfold training within the school grounds to have the trainees achieve a reasonable degree of proficiency and confidence. As we progressed, I needed to check the residential environs for community travel. Mr. Preis took me in his car and showed me various neighborhoods in the vicinity of the school. Then he politely informed me that when I decide on the area for the training, I needed to tell him of the dates and times we would be in the area. An unusual request, I thought and questioned him about it. He said that we would have to submit a request to the local authorities to travel the selected area and the dates of our instruction. This was the law and we had to abide by it. It seems this was a result of the political situation at the time and they were suspicious of any kind of group congregating on the streets. I eventually was furnished with an official letter from the local authorities which stated we had permission to be on those particular streets and was told to carry the letter with me in case the police stopped me. We again had to request permission to travel and instruct in Warsaw proper.

Mr. Preis made arrangements at the bus garage in town so that the students could learn the proper technique of entering and exiting a bus without being pressured to hurry. The usual delays occurred as we arrived at the bus garage, the man authorized to give permission was not available, and no one else would take on this authority. Made me wonder if the powers that be, were concerned that this American would copy secrets of their bus construction. As the students progressed to more congested areas of Warsaw, they were greeted with the questions. Why are these blind people walking the streets? Don't they have a school where they can walk safely? These comments are the same I experienced in the USA, England and France. One has to remind oneself that in that era, independent travel by a blind person was a rarity.

We had an interesting experience at the main intersection in Warsaw. Because of the heavy traffic, there is an underground passage for pedestrians, where one could cross from any direction. As our blindfolded students were using the underground crossing they heard a lot of verbal abuse from the gypsies who frequent this area for panhandling. Apparently, the students were attracting attention of the pedestrians who then were ignoring the gypsies causing them to lose some revenue. I was amazed at the volume and meanness of their yelling..

There are more episodes and sometimes embarrassing experiences from overseas workshops, but I believe I have talked long enough for a Sunday morning. However, before I finish, I would like to share one more memory with you. We had a blindfolded student walking along a main thoroughfare, and as instructed, as he approached the intersecting side street, he listened for approaching traffic. He heard a car pull up to the left and making a stop at the stop sign. To get rid of the sound that the stopped car was making, he motioned with his hand for

the car to proceed. Well, the lady in the Cadillac responded to his gesture by stepping on the gas and hit a car coming down the through street. Later that afternoon, the police chief called me to inquire why we are teaching the blind to control traffic.

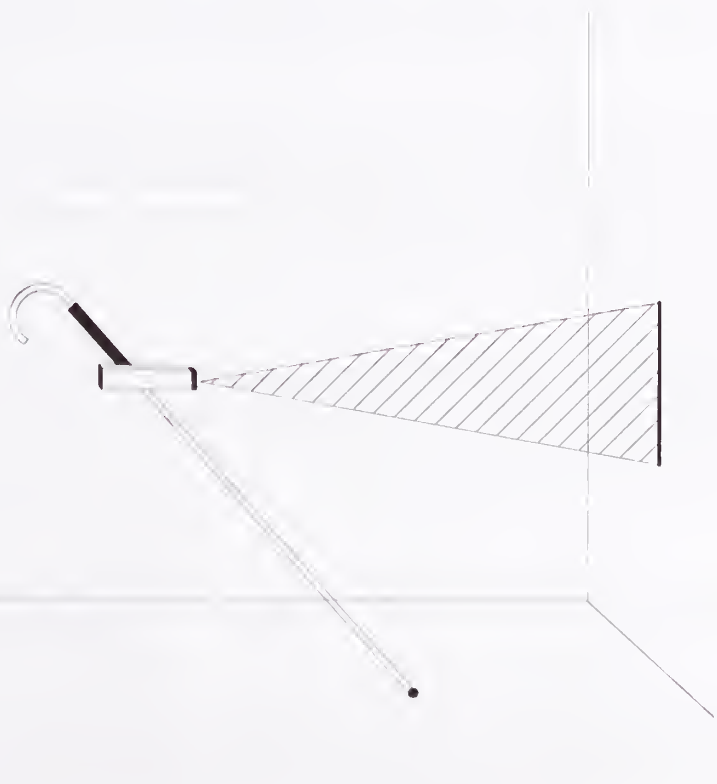
This last little story - One day a blinded veteran went to the Chicago loop for downtown travel with a mobility instructor he didn't especially like. At one of the street crossings on State street, he heard the policeman's whistle directing traffic. As he waited on the corner the policeman approached him and asked if he could help him in any way. Yes, he said. There is a guy following me down the street and he is molesting me. Can you arrest him? Well, the policeman looked around the crowd but could not tell who was following him. So you see, you better be good to your clients or they may get even with you.

One final thought. When I started in mobility, 50 long years ago, one would seldom encounter a blind man traveling independently, today, thanks to so many dedicated Orientation and Mobility teachers, one can see the blind travelling independently in residential areas, shopping areas, and stores. A highlight for me recently one evening, was to see one of our TV stations put on a special showing of a cane user travelling with sophistication and efficiency from home to catch a bus and travel to work.

EXTENDING THE CANE RANGE USING LASER TECHNIQUE

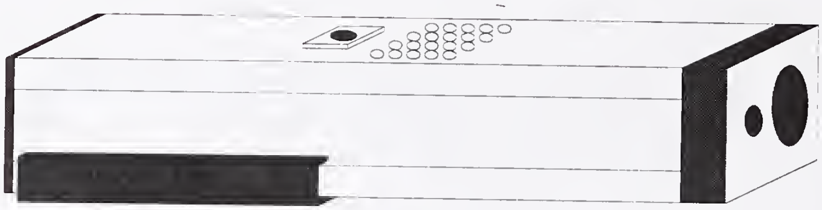
STEN LÖFVING
Optical sensors
Gothenburg, Sweden

Abstract:
Laser Orientation Aid for Visually Impaired, LOAVI is a device for mounting on the white cane, which works like an optical radar in the meaning that it emits light and detects reflections from the environment in an integrated receiver. LOAVI is able to detect and identify a special kind of signs at distances up to about 10 meters or even more in special cases. When the laser light hits a sign during the normal movements of the cane the user will hear a beep telling the user in which direction the sign is located. These beeps can help the user to find the location of the sign and thereby to find the way through difficult environments. The signs can also be identified as one out of 16 different types. That is made possible by designing the signs as a kind of bar codes made of broad or narrow strips of retroreflecting material. A microprocessor evaluates the signals from the optical receiver. If the microprocessor identifies the signal as reflections from this kind of bar code another kind of beep is heard. And if the user presses a button a recorded spoken message like “door” or “elevator” depending of the type of sign will be heard.



Brief description of the unit

The electronic and optic components are mounted on printed circuit boards and they are, together with two AA batteries, contained in an aluminium case with the outer dimensions 160 *37*27 mm. The receiver lens and the laser are located at the small end of the unit.



The weight is of the order 200 grams. The unit can be clamped to the cane and adjusted for different "holding" angles. The mean current consumption is of the order 80 mA indicating a battery lifetime of about 12 hours for rechargeable NiMH batteries.

The Laser source

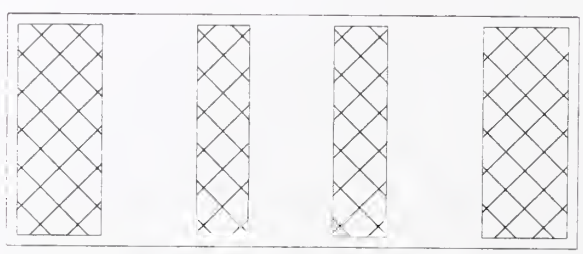
The laser is a small diode laser emitting red light with the wavelength 670 nm. The mean power level is about 0.5 milliwatts. The LOAVI is classed in laser safety class 2.
In laser safety class 2 there are no safety problems and no restrictions regarding the use. The emitted light is shaped by optics so that a vertical line can be seen if the light hits for instance a wall, see figure. The total spread angle is 20 degrees. (Compare to the normal case where the laser light is shaped as a collimated narrow beam forming a small dot when hitting a wall).

The receiver

At the front end of the device there is an optical receiver "looking" in the same direction as the laser. This receiver is only sensitive for light from the laser that is reflected in objects in the environment like the special bar code signs. The receiver is sensitive enough for detecting a standard bar code sign at 10 to 15 meters distance.

The signs

The signs contain 4 vertical strips of retroreflecting material (the same material as on many road signs) mounted on a plate with outer dimensions 270 * 110 mm.



The strips are wide or narrow like normal black and white bar codes. When the vertical laser line is moved over the sign pulses will occur at the receiver output. These pulses are interpreted by the microprocessor as combinations of short and long pulses (ones or zeros). A special beep is heard from the unit when the microcomputer has interpreted the signals as one of 16 barcode combinations. If the user presses a button a spoken pre-recorded message associated to the combination is heard from the unit. The pre-recorded messages are today. "One, two, three, four, five, six, seven, eight, nine, door, men, women, store, elevator and information"

Applicating the LOAVI system

By listening to the beeps a visually impaired person can get access to information about the direction to an object several cane lengths away. This quality can be used when orientating on open areas inside or outside. The signs can be used as checkpoints along a path that a user wants to walk. They can also be used for labeling something that may be hard to find like an exit door from a big room. It is also possible to "read" figures using the LOAVI. For example the bus stop for line 8 could be equipped with the sign number 8.

Further development

It is demonstrated that the receiver can be used for wireless receiving of voice messages that can be heard using the loudspeaker in the unit. One application of this technique is in connection with public traffic. The information flow that is available for seeing people on displays or monitors could be made available for the visually impaired by using this technique.

Comparing LOAVI with GPS

A lot of work has been made to adapt GPS (Global Positioning System) as an orientation and navigation aid for visually impaired. Therefore it may be interesting to compare the kind of information the two systems can offer visually impaired people. Normally the output from a GPS unit is in the form of coordinates. These coordinates can be plotted into a map manually or automatically which may be a very good thing for seeing people. But to help a visually impaired person some further step is necessary. The best thing is of course to be in contact with a human being by a mobile telephone and this is demonstrated. It is also possible to build up a database that relates the coordinates to texts, for example street addresses. This is demonstrated for car purposes. The step that remains to get this information available for visually impaired is to transform texts to sound and this is also demonstrated. The GPS technology can thus offer a possibility to tell the user where he or she is with a resolution on the level "street address" or other descriptions of places when moving outside. The resolution of the relatively cheap and small units is of the order 100 meters but much better than that is possible by using more complicated technique.

The LOAVI technique offers as explained earlier a way to find checkpoints in the near environment inside or outside buildings.

A bit simplified we can conclude that a GPS tells you where you are while a LOAVI tells you where checkpoints are. This analysis indicates that the two systems will probably be used for somewhat different purposes and maybe complement each other.

REHABILITATION AT O.N.C.E.

MARÍA DEL CARMEN OLIVER MARZO
O.N.C.E.
C/ Prado, 24 - 28014 Madrid (SPAIN)

Although in Spain the provision of basic social services corresponds to the different public Administrations, the initiative of ONCE (Non-Governmental Organization) has had a significant importance in the configuration and management of social services specialized for visually impaired people.

ONCE is a public Corporation with social character and is self-managed by its members who direct its activity according to its Statutes in order to achieve the personal autonomy and full social integration of visually impaired people. According to this principle the integral rehabilitation is one of its essential and priority objectives.

To fulfill this objective, due to the permanent social change produced in societies, ONCE is making a constant effort to identify, analyze and define the best adjustment of resources and services available and, particularly, those addressed to rehabilitation, characteristics of its members, etc., being the main principle the full integration of visually impaired people into society.

ONCE had a group of 54,146 members at 31 December 1997.

Concerning sex, 28,053 (51.8%) of members were men while women were 26,093 (48.2%).

The distribution of members by age was: from 0 to 5 years old (794), from 6 to 18 years old (4,175), from 19 to 40 (12,170), from 41 to 65 (19,644) and over 65 years old (17,363). It should be emphasized that 32% of members of ONCE were over 65 years old.

These data indicate that our population is characterized by being, particularly, an adult population in which a third part is over 65 years old and by having remaining vision; that is to say, they present a visual acuity equal or inferior to 0.1 (1/10 on the Wecker scale) or visual field of 10 degrees or less.

These characteristics are highlighted if we analyze the data of demands for membership produced in 1997.

Therefore of 9,697 persons who demanded to be a member of O.N.C.E. last year 4,362 persons were affiliated since they fulfilled all the requirements (44,98% of applicants). However, a great part of applicants who did not meet the requirements to become a member may receive the rehabilitation program that they need (Visual Rehabilitation, Orientation and Mobility and Daily Living Skills).

Persons who became members of ONCE presented the following characteristics:

85% of members were over 18 years old and 38% over 65.

77.7% had remaining vision.

53.8% were women and 46.2% were men.

These characteristics, essentially age and visual remaining, imply that services for personal autonomy should be considered as basic and priority in relation to other programs or interventions and are necessary to propitiate and promote the full social integration of visually impaired people.

In general terms, during the last years the percentage of persons under 18 years old affiliated to ONCE has decreased and, in contrast, the percentage over 65 has experienced a continuous increase. This situation has shown a progressive aging of the affiliated population.

Nowadays, there is at ONCE two different structures to meet this need which service the same user in many cases. However, it should be emphasized that our system for the provision of services is not composed of independent departments without relation among them. But it offers a wide range of responses to the problems faced by visually impaired people and the choice of a particular program depends on the assessment of the needs of the subject as well as his/her personal interests. Capacities and interests are combined and determine, in definitive, the choice of the best alternative to solve the problems that the visually impairment causes the person.

These two structures, on one hand, *visual rehabilitation* aiming at optimizing the remaining vision of the person and *basic rehabilitation* (O&M and DLA) aiming at providing training in specific techniques which minimize or alleviate the difficulties derived from the visual impairment, have common characteristics and differentiated aspects.

The main common characteristics are:

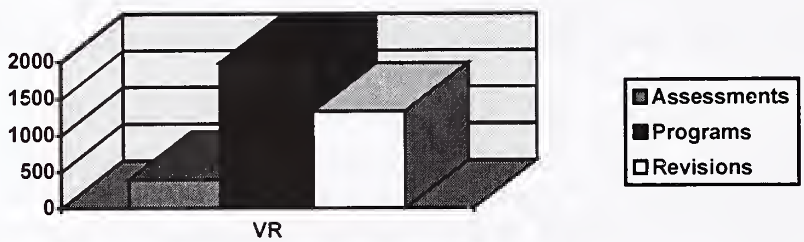
- Rehabilitation programs are free. Access to programs does not have any charge for the user.
- Programs should be demanded by the individual.
- Individualized attention.
- Services are extended throughout the national territory.
- Multidisciplinary work.
- Flexibility to meet the diversity of users.
- Use of the global resources of the Organization to solve the particular problems of each user (accompanying service, facilities for the acquisition of technical aids, economic aids to acquire material, etc.)

Differentiated characteristics:

- Visual rehabilitation is provided in 8 Specialized Centers while basic rehabilitation (Orientation and Mobility and Daily Living Skills) is essentially provided in zone by 31 Multiprofessional Teams distributed nationally, as well as 3 Specialized Centers.
- The number and type of professionals who participate in visual rehabilitation is the same in all cases (Social Worker, Ophthalmologist, Optician-Optometrist and Visual Rehabilitation Expert) and they have clearly delimited their functions and interventions, while in basic rehabilitation it varies depending on the characteristics of each individual program. This way, we can find programs where only two professionals intervene (Social Worker and Orientation and Mobility Instructor) or programs with 7 different professionals (Psychologist, Braille Teacher, Occupational Therapist, etc.).

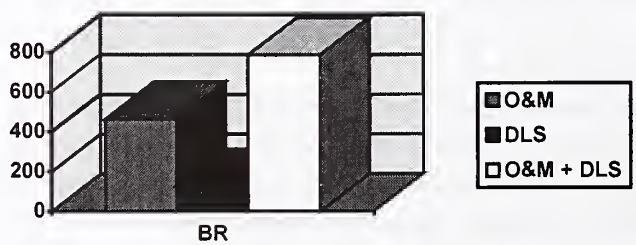
Some data about the programs provided in Spain during 1997 can give a better idea of their volume. A total of 3,720 visual rehabilitation programs were provided and were distributed as follows: 397 assessments, 1,994 programs and 1,329 revisions.

Programs provided in 1997



With reference to the basic rehabilitation program 1,375 persons were attended, from which 463 were trained in Orientation and Mobility, 126 in Daily Living Skills and 786 in both areas.

Programs completed in 1997



Although we believe that the level of basic and visual rehabilitation is very satisfactory in our country, today we are immersed in a new objective: the unification of both programs in order to improve the quality and the levels of attention reached nowadays.

This objective includes the maintenance of the fundamental characteristics of the present rehabilitation model:

1. To promote the intervention in the place of residence of the person.
2. To consider the visually impaired person as an individual with capacity and rights to take his/her decisions in the rehabilitative process.
3. To establish the assessment as a basis for the intervention.
4. To concentrate in objectives which improve the independence and quality of life of the user.
5. To maintain a flexibility of criteria of implementation to meet the needs, interests and characteristics of users.

Integrating the existing basic and visual rehabilitation services aims at improving the quality of the personal autonomy services to meet adequately the needs and interests of the members with the best use of the resources available.

The unification of these programs will result in a substantial change of the present structure and will allow:

- Approach the service to the user.
- Avoid double procedures.
- Unify conditions.
- Have more versatile professionals.

Our challenge for the next years is to modify the present structures under the criteria of unity of action and service to the user in order to satisfy the changing needs of the visually impaired persons and improve the levels of quality of the programs favoring the personal autonomy.

THE EFFECTIVENESS OF A PEDESTRIAN-ACTIVATED AUDIBLE TRAFFIC SIGNAL

AGATHE RATELLE [1], CAROLE ZABIHAYLO [1], RAYMOND ALARIE [2], PAUL BARBER [3], RENÉE GEOFFROY [4], SYLVIE MATHIEU [4], JACQUES GRESSET [5]

[1] Institut Nazareth et Louis-Braille, Longueuil, Québec .

[2] Centre de réadaptation de l'Estrie, Sherbrooke, Québec.

[3] Montreal Association for the Blind, Montréal, Québec.

[4] Centre de réadaptation Le Bouclier, Repentigny, Québec.

[5] École d'Optométrie, Université de Montréal, Montréal, Québec.

Introduction

Audible traffic signals (ATS) have been installed for many years in several countries to facilitate street crossings for visually handicapped persons. Despite the controversy around their installation, it was agreed that certain intersections were not accessible to visually impaired travellers with conventional street crossing techniques. Such intersections have been identified (T-shape, off-set, and absence of parallel cues, etc) and acknowledged in different studies (Uslan, 1990; Hall, Ratelle, Zabihaylo, 1994).

In Quebec, orientation and mobility specialists, blind consumers and city engineers created a team effort in order to clarify the needs and establish standards. The partners agreed that ATS installation must meet the following conditions : user safety must not be compromised, signals must be uniform and create minimum noise pollution. Analysis of risk levels using ATS was conducted to define fundamental conditions to guarantee security : no interpretation error, straight line of travel throughout the crossing, minimum risk of vehicular-pedestrian conflict. A new concept in the ATS use was then developed by Hall, Ratelle and Zabihaylo to meet these criteria. The concept combines specifications for operation, optimal acoustic characteristics and a traffic-control pattern that should be a part of every ATS installation:

1. Operation

- Alternating signals : to identify the crossing (avoid interpretation errors) and allow alignment before and during crossing (ensure the straight line of travel).
- One crossing per intersection: to reduce confusion and noise pollution.
- Pedestrian activation with an auditory localisable call-button : to facilitate localisation, reduce noise pollution, vandalism. An integrated code (ATS only being emitted when push button is pushed more than 6 seconds) was added to minimise sound emission.
- Reliability of the ATS under different climatic conditions.

2. Acoustic characteristics

- Type of signal: melody is recommended (avoid confusion with other environmental sounds, easier to localise since it is a complex sound).
- Frequencies: fundamentals in low frequencies to facilitate localisation (300 to 1000 Hz), harmonics extending to 7,000 Hz.
- Intensity: signal has to be heard from the opposite corner, should adjust according to the level of traffic noise.
- Duration of signals: walk and don't-walk phases should sound detectably different. Signals length should be in consideration of alignment accuracy and the fact that users must initiate crossing as soon as possible. Four notes (1.2 sec) in the walk phase and 3 notes (0.9sec) in the don't- walk phase was considered the best compromise.
- Speakers position: must be in the middle of the crosswalk lanes. Extensions may be necessary.

3. Traffic control

- Parallel traffic has to be partially or completely stopped while the signal is emitted.

A previous study (Stevens, 1994), comparing the ability of blind persons using an alternating signal versus a simultaneous one established a significant difference between operation modes. It was demonstrated that subjects were able to align more accurately and quickly when using the alternating signal.

Study Objective

This study examines the effectiveness of a pedestrian-activated alternating signal in a T-shape intersection by a group of functionally blind persons. It evaluates the entire concept suggested by Hall, Ratelle and Zabihaylo in terms of safety, residual risk factor and training needs.

Methods

Twenty-four functionally blind subjects were asked to cross a wide street using an ATS until 3 consecutive successful crossings were completed. Naive subjects, aged 18 and older, were recruited through rehabilitation centres, using the following criteria : light perception or less, no known hearing impairment (hearing questionnaire from Institut Raymond-Dewar), minimal street crossing at a light-controlled intersection (once in the last year), ability to use a cane to negotiate the crossing, and not being familiar with the intersection.

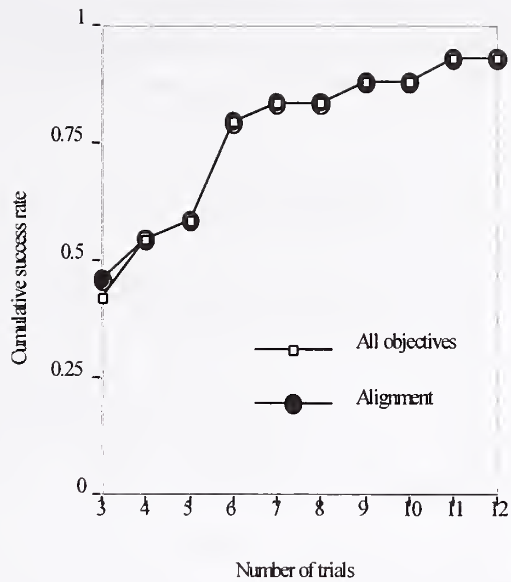
The ATS was installed in the east crossing of a 6-lane median T-shaped intersection located in a Montreal business area, near a housing complex for the blind. The "head" of the T was a busy east-west street, the "tail" a quiet one-way street leading south. The light remained green on the busy street unless a pedestrian activated a call-button. The blind individuals could only cross the busy street with an ATS. The device used was a Novax system, equipped with a melody previously chosen by the team (research audiologist, blind consumers, O&M special-

ists). A city technician programmed the system to emit alternating mode throughout all the pedestrian phase (starting from the opposite corner) and the integrated code (activates the ATS only). The call-button emitted a brief signal every 8 seconds. The participants, after pushing the call-button for a period of 6 seconds), heard a continuous sound informing them that the ATS was actuated. The experiment was conducted during 2 days of similar conditions (no rain or snow, low wind factor and no rush-hour traffic) .
Prior to the experiment, the subjects received the following information : familiarisation with the intersection, ATS operation, recognition of the different sounds, general unfolding of the test. A sound localisation test was also administered. Upon their arrival at the site, subjects were familiarised with the entire process, using sighted guide technique. Crossing tests were made from the SE to the NE corner. Six departure positions (3 on the busy street and 3 on the quiet street, situated at 20, 40 and 60 feet from designated corner) were semi-randomly assigned.

The participant was placed at one of the positions. The success of each trial was determined by the attainment of these six criteria : localisation of the call-button within 1:10 to 1:30 minutes depending on the starting position, comprehension of the integrated code, repositioning at the corner (position up to 0.5m (1.5 ft) outside of the crosswalk lines was accepted), departure time within six seconds, straight line of travel during the crossing (veering up to one meter outside of the crosswalk lines was accepted), crossing within the time limit (maximum of 27 seconds). After failure to achieve a task, the subject was stopped by the experimenter and given additional instructions. Three consecutive successful trials had to be accomplished with in a maximum of 12 crossings. If failure occurred on the 10th or 11th trial, the experiment was stopped since it was impossible to attain the study's final objective. When the experiment was completed, the subject was asked to answer a questionnaire on this system and give his appreciation. Each of the ATS's components were rated from 1 to 5.

Results and Discussion

The group was composed of 15 males and 9 females involving 13 cane users and 11 guide-dog users. The age ranged from 26 to 58 years old. Out of the sample 22 subjects (91,7%) attained the final objective in less than 12 trials. The learning curve is presented in figure 1. The 2 subjects who failed succeeded in some trials but never reached the criteria of 3 consecutive success. These subjects usually travelled with a guide-dog in familiar routes, and were diabetic. At certain points in the experiment, they seemed fatigue and lacked concentration, leading to fluctuations in their performance. The oldest performed 3 successful trials out of 10 and the other, 5 successful trials out of 11.



One subject had a perfect score on the hearing questionnaire but failed part of the sound localisation test (right side).

This subject attained the objective within 6 trials. The subject was suspected of having a hearing impairment. A subsequent hearing test revealed a moderate binaural neuro-sensorial hearing loss.

Each task was considered separately. The **localisation of the call-button** was successful for all 24 subjects. The mean time to localise the call-button was 25 seconds (minimum: 6; maximum: 84). The **integrated code** task was achieved by all subjects. Twenty-three subjects succeeded in **repositioning at the street corner** in all trials. The subject that failed this task succeeded in the 3 following trials. In regards to **departure time,** we observed only 1 failure (the subject did not attempt the crossing) out of the 125 total trials. The shortest time was 1 second, the longest was 6 (mean: 3.3). Maintaining a **straight line of travel** was the experiment's most difficult task, even though 10 subjects succeeded in the first 3 trials (figure 1). As for **crossing in the appropriate time**, 120 trials were successful. Out of the 5 that were unsuccessful, 3 exceeded 27 seconds while the other 2 were eliminated through failing former tasks. The mean crossing time was 22 seconds (minimum: 17; maximum: 28). Most of the evaluated tasks were completed very quickly by the 22 successful subjects. The straight line of travel item seems to require more training (figure 1). This task is the most crucial among the required abilities to achieve safe crossing with ATS.

The subjects appreciated all elements of the ATS (operation mode, melody, intensity) and rated them highly. Alignment before and during the crossing was rated easy (mean score: 4.2 and 4.3). The safety level provided by the system was rated 4.6 in the mean. The mean global appreciation was 31.2 on 35.

The majority of the subjects were able to use the ATS system (modified Novax) efficiently after only a short training time. Since the majority of subjects were able to accomplish the necessary tasks safely (activate the system, reposition at the street corner, start and cross within the time limit and maintain a straight line of direction), we can consider the risk level with this system quite low.

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GUIDE DOG OWNERSHIP AND THE ROLE OF THE REHABILITATION WORKER

PETER WILBY,
National Rehabilitation Services Manger,
The Guide Dogs for the Blind Association,
Hillfields, Burghfield Common, Reading, Berkshire, RG7 3YG, U.K.

ALAN BROOKS,
Regional Controller - South West Region,
The Guide Dogs for the Blind Association, Exeter Training Centre,
Cleve House, Exwick Lane, Exeter, EX4 2AR, U.K.

Introduction

This paper outlines how the role of the rehabilitation worker has developed in relation to guide dog training in the United Kingdom.

Historical perspective

There are a number of parallels in the development of services for the blind both in the U.S.A. and U.K. In 1930, guide dog provision was first offered in the U.S.A. by The Seeing Eye. The following year, The Guide Dogs for the Blind Association trained its first clients. Both organisations received considerable help from Dorothy Harrison Eustis who generously shared her knowledge. An American by birth, she studied the development of guide dog provision in Europe from her base in Switzerland.

As late as the 1950s, applications for guide dog training in the U.K. were limited to women under the age of 45 and men under the age of 50 who were totally blind, in employment and fit and active. There was no shortage of applicants, as two world wars had resulted in war blinded veterans meeting this very clear but restricted criteria, and in any event, the availability of guide dogs was limited.

Training problems presented at that time were comparatively simple, because clients with additional health problems or disabilities were not accepted for guide dog training. However, over the years, the criteria for acceptance has gradually been widened and we now consider anyone over the age of 16, resident in the U.K. who experiences difficulties with mobility because of their visual loss. There is no upper age limit. This widening of the criteria plus the fact that the average age of our clientele is rising, often bringing with it age related problems, creates extra challenges for GDBA.

Guide dog instructors' experience and skills have developed over time to meet the needs of clients who present with these additional problems. Consequently, over the past two decades a much more structured and organised training programme for Guide Dog Mobility Instructors

has been developed. (This has lead to the situation where a number of guide dog instructors in the U.K. possess the dual qualification of Orientation and Mobility Officer and Guide Dog Instructor).

The role of the Rehabilitation Worker

Since its foundation in 1931, 20,500 guide dog units have been produced. Currently, there are 4,600 working guide dogs in the U.K. However, in 1990 GDBA recognised that there was a downward trend in the number of people applying for a guide dog, despite the fact that market research commissioned by GDBA indicated that there was unmet need within the community. It is suggested that this was, in a large part, due to professional workers not recognising peoples' potential for guide dog ownership. There was also a misconception by professional workers and members of the public of the criteria for application, in that some potential applicants were not seen to conform to the perceived guide dog owner norm. Moreover, in some areas, no specialist workers for visually impaired people existed to advise potential applicants.

It also became clear that there was an increasing need to provide applicants with pre-training in O&M before they were ready to be accepted for training with a guide dog.

These factors lead to the creation of GDBA's Rehabilitation Services Department, which now plays a central part in identifying and informing potential applicants and providing pre-guide dog training to those who require it. Incidentally, as a direct result of its work, a surprising number of younger people aged between 20 and 60 have been identified who are now established guide dog users.

GDBA now employs rehabilitation workers at all of its fifteen Regional or Small Centres. In addition, a number of its rehabilitation workers are sub-contracted to local authorities to provide a rehabilitation service on their behalf.

Guide dog applicants and the training process

Enquiries that arrive at a Training Centre are initially dealt with by the Rehabilitation Department, allowing the Guide Dog Mobility Instructors to fully concentrate on the time-consuming task of dog training. As the enquiry progresses, information on the range of services offered by GDBA is provided. For example, daily living and communication skills training, hotels that specifically cater for guide dog owners, holiday activities, etc.
We also advise them of services and opportunities available from other agencies.

The needs of elderly clients who are more likely to suffer from additional health problems or disabilities require particular attention when undertaking any form of mobility training. More than 15% of our current clients are over the age of 70. Latest figures show that out of a total of 883 people trained with guide dogs during 1997, 209 had significant problems in addition to their visual impairment. As would be expected, the largest proportion of these were suffering from diabetes.

By combining the skills of the Rehabilitation Worker and Guide Dog Mobility Instructor, we now find that it is not unusual to be training a client with their first dog when they are aged over 80. Guide dog training can be provided on a residential, domiciliary or semi-domiciliary basis according to the client's needs. It is important to emphasise that these are not token guide dog owners, but people who are active and independently mobile. However, through guide dog ownership, they enjoy the important but secondary benefit of companionship.

Of course, we do not claim what has been done in the U.K. is unique, and we readily acknowledge the sterling and innovative work that is carried out by our colleagues in other countries. For example, we are aware that South Africa, Australia and New Zealand require their guide dog instructors to be dual qualified in O&M skills. This is a position yet to be achieved in the U.K.

A Success Story

Mike (not his real name) is someone who suffers from a number of disabling conditions. He came to us for his first dog in 1992 when suffering from Ushers Syndrome and multiple sclerosis. He has a profound hearing loss and a severely restricted field of vision. He also suffers from problems with his balance and uses a walking stick as a consequence. Further initial complications were brought about due to a move to a new home area and a consequent lack of knowledge of his neighbourhood and local routes.

After assessment, a training plan was put into place. The rehabilitation worker visited Mike on a daily basis and covered agreed routes in his home area. Instead of using a long cane, a guide dog harness handle was employed. We applied the straight line concept which is the foundation of most guide dog training. This resulted in routes being learnt and the identification and utilisation of landmarks and clues that would be required when working a guide dog.

Mike would not be viewed by many people as the stereotypical guide dog user, but it demonstrates what can be achieved. He is still enjoying the high standard of mobility provided by his dog as he travels his home city of Liverpool.

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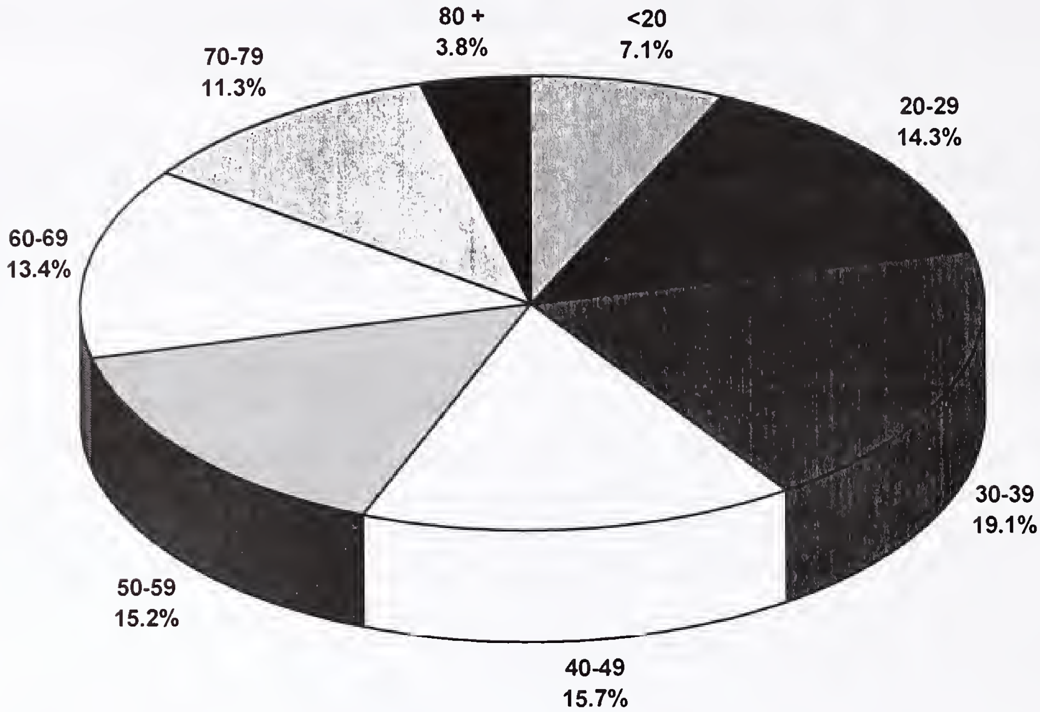
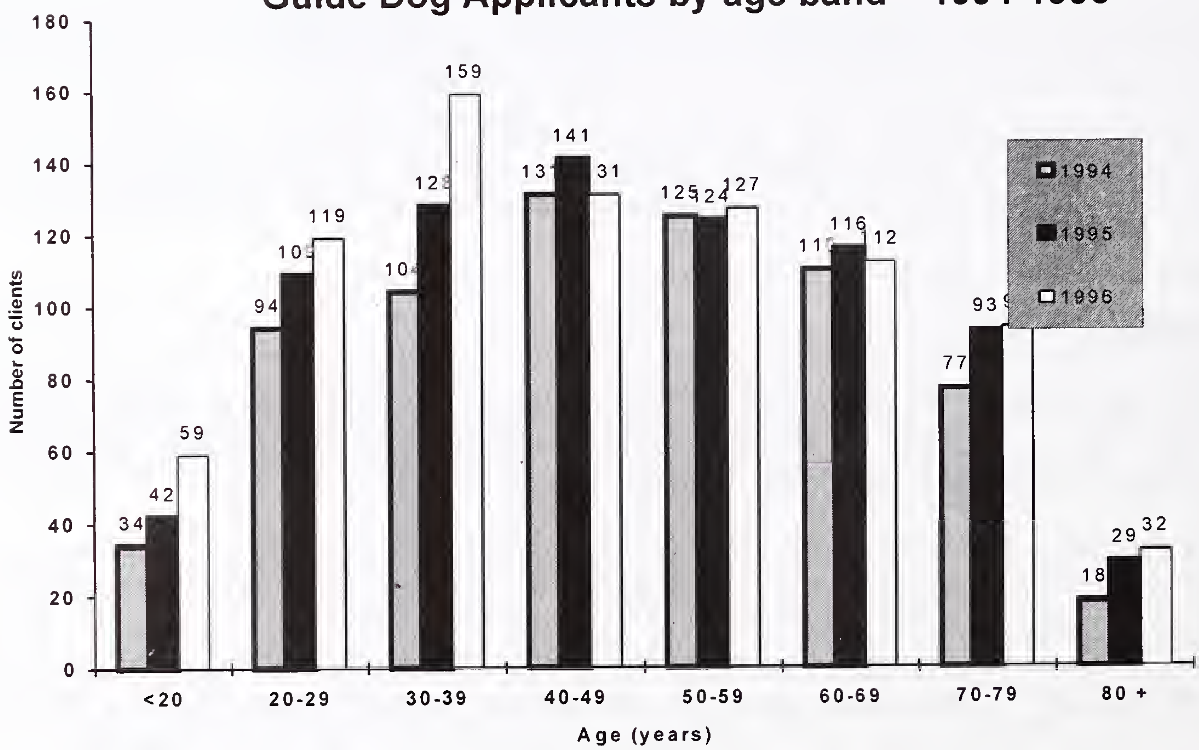
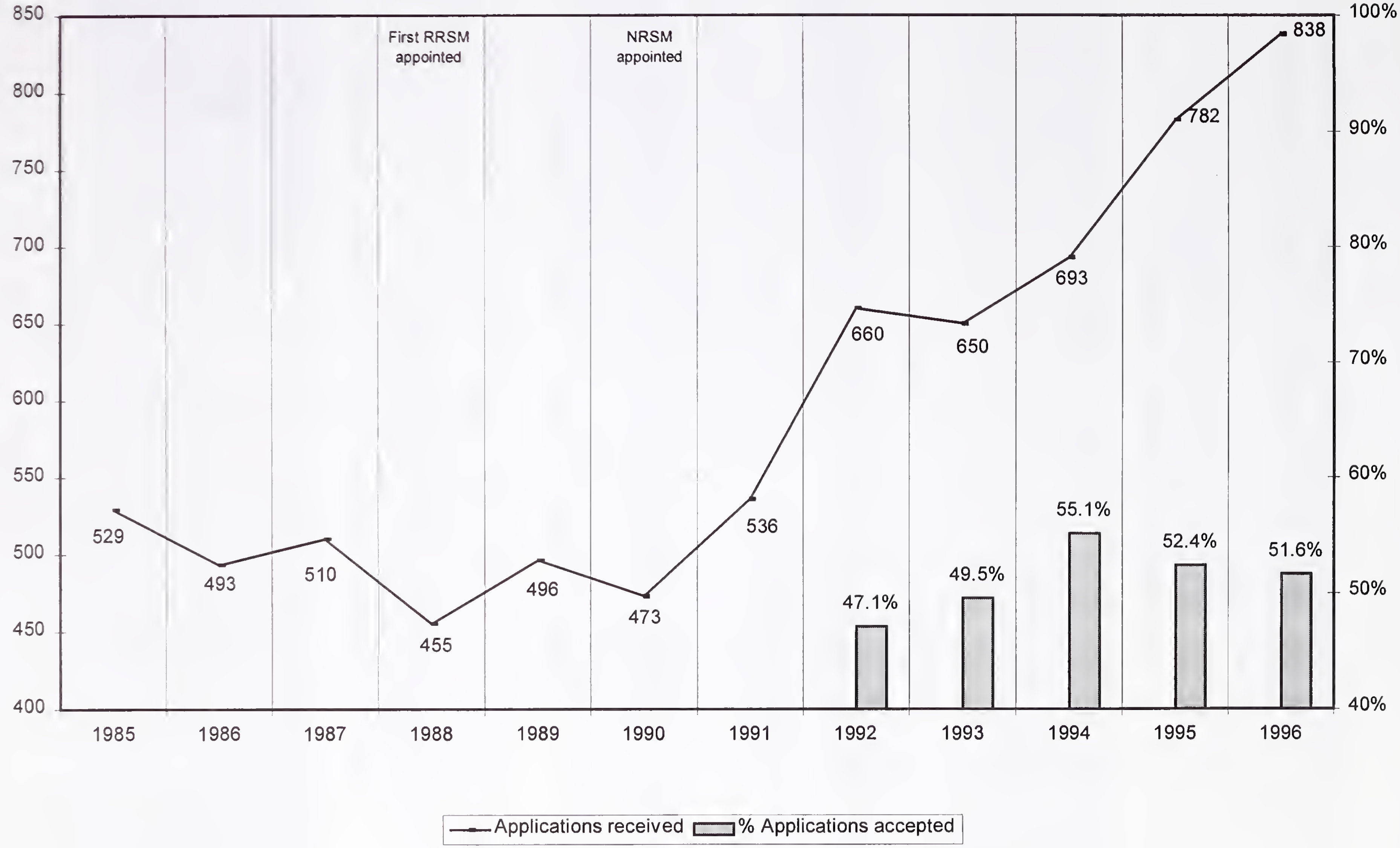
1996 Guide Dog Applications by age band



Guide Dog Applicants by age band – 1994-1996



Application Trends: 1985 - 1996



ACCESSIBLE PEDESTRIAN SIGNALS IN THE US: THE ISSUES, AND CURRENT TECHNOLOGIES

BILLIE LOUISE BENTZEN, PH.D.
Accessible Design for the Blind
P.O. Box 1212, Berlin, MA 01503, USA

The Americans with Disabilities Act requires that information which is available to help non-disabled travelers, be made available to persons with disabilities. At signalized intersections, persons having normal vision have visual information in the form of the traffic lights, and, often, pedestrian signals, to let them know the status of the light cycle. Accessible pedestrian signals (APSs) can be used to provide this information to travelers with visual impairments.

The Issues

Issues regarding whether and which type of APS should be used in any situation include the following: standardization versus optimization for particular intersections or users; optimal characteristics; pedestrian activated versus automatic; and loud enough to function as beacons versus just loud enough to alert users to the change in signal status.

Current Technologies

A number of technologies exist which provide walk and don't walk information. APSs provide information in either audible or vibrotactile form, or both. All products produce a sound, vibration, or both, during the walk interval. Beyond this there is great variation in the functional characteristics of different products, with some providing information throughout the signal cycle.

Currently available products are of three types.

- speakers mounted in, on or near ped heads,
- transmitters mounted in or on ped heads, and
- speakers and vibrating hardware which is integrated into the push button.

Products that have speakers mounted in, on, or near ped heads emit a sound such as a bell, buzz, tone or bird call during the walk interval. If such a signal is loud enough to be heard from the opposite curb, the tone is highly localizable, and the speaker is carefully oriented, the signal also provides guidance for going straight across the street. If the tone is not highly localizable or the speaker is not carefully oriented, such a signal may give ambiguous information about which street has the walk interval, and may give false information about the direction of the crosswalk. If it is loud enough to be heard across the street, it may be perceived as obnoxious by other persons in the vicinity, and it may mask traffic sounds which provide critical information for the safety of pedestrians who are blind.

Products in which an infrared transmitter is located at the ped head transmit a speech message to hand held receivers. There is no noise pollution with such a system—the information is only received by individuals when they desire it. The information is highly directional. The information regarding the light cycle can only be picked up when the user is standing at the crosswalk and has the receiver pointed in the direction of the opposite curb, where the transmitter is located. Messages may identify the location and direction of travel of the pedestrian, the name of street to be crossed, and provide real time information about walk and don't walk intervals. For example, in the Talking Signs® system as currently deployed at intersections in San Francisco, as blind pedestrians approach a corner from as much as a half a block away, they hear a message including the name of the street on which they are traveling, the direction of travel, the 100 block they are on, and the name of the intersecting street they are approaching. As they reach the intersecting street, and only if they are standing within the limits of the crosswalk, they hear a repeating message stating the name of the street and the status of the cycle. For example, "Grove Street, Wait," or "Grove St., Walk sign." A transmitted system can convey more, and more precise information about individual intersections than any other system. It is excellent for atypical intersections where there are more than four crosswalks, and when direct signals such as tones may overlap and be confusing. It does, however, require users to have and use receivers.

A third type of APS, which has been standard in Australia, Sweden and elsewhere for many years, is fully integrated into the push button assembly. The push button-integrated products typically have a quiet locator tone emanating from the push button assembly during the don't walk and clearance intervals, and a louder, faster, tone during the walk interval. Some provide vibratory information instead of or in addition to tones. This type of APS is now available in the U. S.

Information Provided by Accessible Pedestrian Signals

The most important information provided during the walk interval is: "When does the walk interval begin?" The audible answer to this question must be readily heard from where pedestrians begin their crossings, it must clearly convey that it is time to walk, and it must be unambiguous with regard to which street has the walk interval. It should be no louder than necessary.

At pedestrian actuated intersections, it is extremely helpful to have a quiet tone emanating from the vicinity of the push button. This locator tone informs pedestrians that they need to interact with a push button to actuate the walk interval, and it guides them to the push button. Audible locating signals typically sound during the don't walk interval and the clearance interval. They have a slowly repeating tone or ticking sound which is adjusted to be heard no more than 6 to 12 feet from the push button. The locator tone helps pedestrians who are blind to locate the up curb even if they are finishing their crossing in the clearance or don't walk intervals.

In some signals the push button, a second button on the bottom of the push button housing, the entire push button housing, or a raised arrow vibrates during the walk interval and, in some cases, the clearance and don't walk intervals. The vibrating signals may or may not be combined with audible signals. In signals having both types of information, the vibration is synchronous with the pulsing of the audible signal—slow during don't walk, and faster during walk. The vibratory information feature lets pedestrians who are deaf-blind know when the walk interval is in effect.

Either a light or a tone, or both may indicate to pedestrians that their actuation request has been received. The indicator assures pedestrians that the device is working, thereby encouraging pedestrians to wait until the onset of the walk interval.

A raised arrow on the push button housing functions primarily to help users be certain which street is controlled by a given push-button. It is of minimal assistance in aligning for a crossing, however. The arrows which work best for persons who are blind are normally ones which are oriented so that they can be read with the hand held in a horizontal position, and which have a relatively long shaft. They should contrast markedly from their background so that all users, including those having low vision, will see them readily.

A modified push button can actuate a walk interval each time it is pushed to cross a street, but only actuate an audible signal if it is pressed for at least three seconds. Blind pedestrians who don't wish to add noise to the environment or to call attention to themselves, can actuate the walk interval without actuating the audible signal. Most pedestrians will not actuate the audible feature.

Most Important Functional Characteristics of Accessible Pedestrian Signals

The most important functional characteristics of accessible pedestrian signals which provide directly available auditory information specifying the status of the signal cycle are:

- they are highly localizable;
- they have a locating tone if actuation of the walk interval requires use of a push-button;
- they are unambiguous in indicating which street has the walk interval;
- they are responsive to ambient sound; and
- they vibrate on walk.

Desirable but optional characteristics are:

- they have a change tone at the onset of walk;
- they have a different tone for the clearance interval;
- they have an audible and visible actuation indicator; and
- they have a tactile map or symbols depicting intersection information.

The most important considerations for accessible pedestrian signals which transmit personal messages are:

- the messaging is unambiguous;
- messages are heard only when receivers are oriented toward transmitters; and
- there is a system for distribution of receivers.

Installing accessible pedestrian signals

Precise orientation is critical. If a speaker or transmitter is oriented even a few degrees different than the associated crosswalk, pedestrians can be led into the center of the intersection.

Push buttons must be installed as near the crosswalk as possible, preferably within the crosswalk, and along the curb line. Where two push buttons are needed on the same corner, they should be on separate poles at least 10 feet apart. Standardization of push button location is very important.

The sound level should be carefully set. Sound should be between 30 dB minimum and 90 dB maximum. At no time should be sound be more than 5 dB above ambient sound.

ASSESSMENT AND TRAINING OF GUIDE DOG OWNERS FOR ESCALATOR USE

JOHN BLACK
Guide Dog Association of New South Wales and A.C.T.
PO Box 107
Milsons Point NSW 2061
Australia
Email - services@guidedogs.com.au

The author acknowledges equal input to this research from Carla Morgan & Raymond Joyce.

Increased use of escalators by guide dog owners (GDOs) poses a dilemma to those training schools which advise against using guide dogs on escalators. On the one hand, some schools consider the practice unsafe and discourage/forbid the taking of dogs on escalators. On the other hand, the failure to provide professional assessment and training for guide dog units may lead to increased safety risks for the unit.

This paper presents assessment and training criteria for GDOs intending to use escalators. The criteria have been developed from earlier empirical research which surveyed the use of escalators by guide dog units and which identified frequently occurring skill deficits (Black, Joyce and Morgan, 1997).

1. ASSESSMENT (without dog)

Prior to attempting training of the guide dog unit in escalator travel, the following skill check is conducted with the GDO in the absence of the dog.

ASSESSMENT OF ESCALATOR SKILLS

GDO will, without using a cane:

- Locate landmark/cue for orientation to escalator (instructor may provide sighted guide giving verbal directions re location of escalator).
- Locate base plate.
- Locate hand rail.
- State, whether the escalator is moving away from, or towards them.
- If it is moving towards them, back off (to landmark).
- If it is moving away from them, locate the moving step with their toes.
- Take firm grip on handrail and step onto the escalator while maintaining balance.

- Move hand forward on rail and right foot on upper step.
- Detect flattening with hand and right foot.
- Step off escalator.
- Clear disembarkment area promptly

The above skills are necessary (but not sufficient) in order for the guide dog unit to safely use escalators.

2. TRAINING (without dog)

If the GDO lacks any of these, skills a training program is provided. The GDO cannot proceed to training in escalator use until these preliminary skills are mastered.

While the GDO may be able to perform these skills using a cane, it is important that the Check be carried out without a cane. The GDO must eventually perform all the skills without use of a cane.

The Skill Check and training is done by either an Orientation and Mobility Specialist or Guide Dog Instructor.

As well, the GDO needs to demonstrate appropriate recall of the following:

1. Older (wooden floor) escalators with wide tooth combs are dangerous and should never he used with a dog.
2. GDOs should not use an escalator if they are unsure about its design (wooden vs metal steps). It is necessary to check a GDO's knowledge directly by accompanying the GDO to the escalator and observing its design.
3. Escalator speed can be varied. Escalators are set to various speeds and this will affect the GDOs use, especially getting on and off the escalator. A faster escalator will leave less time for disembarking, may have more congestion at the disembarkment point and may be more difficult to board.
4. Short escalators allow very little time to position dog and get set for disembarking.
5. The sides of escalators where the steps are move against the wall, are also risk areas though less so for dogs than for inquisitive children.
6. Wide escalators may introduce added risks because of other people attempting to squeeze past.
7. GDOs should not use escalators if they are managing young children or if there are other things which might distract or obstruct the dog at the disembarkment point.
8. The direction of escalators can be changed. This is often the case where there are a number of escalators carrying high numbers of pedestrians in peak hour. For example, the morning "up" escalator might become the evening "down" escalator.
9. Escalators have an "off" switch, usually at both ends which switches the movement off. However, these switches are not easy to find, especially in an emergency.
10. Using an escalator while lifting/carrying the dog has been advocated in the past, although it is not a popular technique with GDOs. The technique itself poses difficulties (e.g. imbalance and a fall on the escalator) which makes it too risky for some, if not

most GDOs. Empirical study suggests that lifting the dog by the backstrap is a technique that very quickly becomes unsafe (Black, et al, 1997).

11. GDOs should seek out stairs and lifts when in unfamiliar settings and at times when escalators are congested.
12. The "flattening out" section of escalators can be short or long. This will effect the timing for disembarking.

3. TRAINING (with the dog)

Once the GDO has demonstrated mastering of the preliminary knowledge and skills, training in the use of escalators with a guide dog can commence under the direction of an Instructor qualified in guide dog work.

The minimum skills for safe escalator use are listed by task analysis. The GDO needs to demonstrate competency in all these skills by the completion of training.

4. TASK ANALYSIS

1. Locate landmark/cue for orientation to escalator.
2. Locate base plate. Drop harness and put dog in heel position (left side).
3. Locate hand rail with right hand.
4. Determine direction of escalator.
5. If the escalator is moving towards the GDO, then the GDO backs off (to landmark).
6. If the escalator is moving away from the GDO, the GDO explores escalator with their right foot by putting half their foot onto the escalator and feeling the moving steps. (Short leash on left hand).
7. With half foot on step GDO feels each step pass by. After waiting 10-15 seconds, GDO grasps handrail tightly and steps on. (The 10- 15 second wait is to lessen the likelihood of congestion at the disembarking point). At the same time the GDO gives the forward command. (It is important at this point to get both user and dog on together).
8. GDO then stays put, holding the dog back. The GDO's right foot remains one step ahead of their left. The dog's front paws are on the same step as the GDO's left foot.
9. Right hand is placed forward on hand rail.
10. GDO detects flattening of escalator with right hand and almost immediately detects exit point with right foot. On detecting exit point with right foot, GDO immediately gives a forward command and steps off with the left foot.
11. The dog should (and generally will) walk/jump off. GDO avoids a jerky action and encourages the dog to hurry off. The dog learns to judge its exit.
12. In disembarking, the dog is allowed to pass the user, getting out in front a little with GDO allowing the leash to lengthen. The GDO should then be able to take another step with their right foot and pick up the harness. In escalator training it is best to start with "up" escalators.

5. ROLE OF THE ORIENTATION AND MOBILITY SPECIALIST.

The Orientation and Mobility Specialist will often be the most appropriate professional to conduct the assessment and preliminary training. Only once the GDO demon-

strates the preliminary skills can the introduction of the dog be undertaken. The preliminary skills are part of the set necessary for use of the dog on escalators.

The training of the guide dog unit requires the input of professional skills in Guide Dog training. While some schools have separate Orientation and Mobility and Guide dog professionals other schools have multi-skilled professionals. Regardless, the appropriate expertise is best introduced in a complementary manner.

6. POLICY AND PROCEDURES OF THE GUIDE DOG ASSOCIATION OF NEW SOUTH WALES AND A.C.T.

POLICY:
Any GDO may request training in the use of escalators with their Guide Dog.
Before training is offered the unit will need to demonstrate prerequisite skills.

PROCEDURE:
In recognition of the special requirements for escalator use the following procedures are used.

1. A request for advice/training in the use of escalators is taken as a referral.
2. The referral is assigned to an Instructor who will conduct an assessment of the GDO's escalator skills (without the Guide Dog). The assessment includes a skill check.
3. If prerequisite skills are confirmed by direct demonstration by the GDO, the unit proceeds to escalator training with the dog.
4. If prerequisite skills are incomplete, training of the prerequisite skills is undertaken in an attempt to prepare the GDO for escalator training. At the appropriate time another skill check is completed. This training can be completed by an Orientation and Mobility Specialist.
5. If despite attempted training of prerequisite skills, the GDO is unable to demonstrate competence, the training with the dog will not be undertaken.
6. If escalator training with the dog is undertaken it will cover all of the tasks identified in the task analysis. This training is completed by an Instructor qualified in Guide Dog work.
7. Before a final recommendation is made on escalator use, the unit will need to demonstrate competence in all of the tasks listed in the task analysis.
8. A follow up check will be completed, using the task analysis checklist, one month after the escalator training is completed.

John Black, Ray Joyce and Carla Morgan. 'Escalator Use by Guide dog Owners.' *Journal of Vision Impairment and Blindness.* Accepted for publication, 1997.

TRAINING IN SAUDI ARABIA (PAST-PRESENT-FUTURE)

MOHAMMED AL-OMAIR
& ANWAR AL-NASSAR

The history of Orientation and Mobility in the Kingdom of Saudi Arabia can not be separated from that of the history of education for the visually impaired.

Prior to the establishment of formal education for the visually impaired, problems relating to orientation and mobility were left to the parents, relatives, peers and or the individual to tackle through the process of trial and error, however, a lot of those individuals managed, against all odds, to acquire some basic mobility skills which enabled them to achieve high status in society motivated primarily by the teachings of Islam which call for greater independence on the part of the person regardless of his or her visual impairment.

Now, Orientation and Mobility Training is an integral part of the curriculum offered to children in educational programs for the visually impaired.

In the future, the General Secretariat of Special Education Aims to extend adequate systematic training in orientation and mobility to every visually impaired person who needs it: this will be done by increasing the number of specialists in this field and providing the educational programs with the latest in terms of Know-how and equipment.

Trends in AMD Use

ANNETTE C. SKELLENGER
Department of Blind Rehabilitation
Western Michigan University
Kalamazoo, MI 49004

As the population of individuals served by O&M Specialists has changed across the years, adaptations have been made in the methods and materials used to instruct individuals in independent travel skills. One significant adaptation has been the development and utilization of Alternative Mobility Devices (AMDs) to replace or supplement the long cane. AMDs were initially suggested for use with preschool-aged travelers and were quickly adopted for use with children with severe, multiple disabilities. Recently their use has been suggested for adults with multiple disabilities and senior adults. Although the professional literature has included a limited number of articles proposing the use of AMDs, little is known about the prevalence of their use, the populations currently using AMDs, and instructional practices related to their use.

This poster presents the findings of a survey of 120 O&M Specialists (62% return rate). Respondents had been teaching O&M for a mean of 11.4 years. Seventy-five percent of the respondents indicated they have taught AMD use. Fifty percent indicated they are currently teaching AMD use, and analysis indicates respondents are each teaching AMD use to a mean of 4 students. The type of device taught most often is a two-shafted device (e.g., Connecticut cane). The majority of students being taught to use AMDs are of preschool age both with and without additional impairments (60%), however students between 6 and 17 years of age with additional impairments are also being taught in fairly high numbers (22%). The majority of instruction and monitoring is being done by O&M Specialists (86% and 63% respectively) with parents and Teachers of Children with Visual Impairments taking some responsibility for these activities.

AN ADAPTIVE MOBILITY DEVICE FOR INDIVIDUALS WHO CANNOT USE A TRADITIONAL LONG CANE

RICKILYN M. MANCIL, MA, COMS
Vision Rehabilitation Research Laboratory; Salisbury VAMC
STEPHANIE MANUEL, MSEE
Rehabilitation Research & Development Center; Atlanta VAMC
EILEEN SIFFERMANN, MA, MED, COMS
Orientation & Mobility Specialist; Tucson
BRUCE B. BLASCH, PHD
Rehabilitation Research & Development Center; Atlanta VAMC

BACKGROUND

Many individuals who are multiply impaired, or older and visually impaired, are unable to use the traditional long cane because it requires strength, coordination and cognitive abilities they may lack. Young children, as well, may not be physically able to use the long cane. An adaptive mobility device (AMD) requires minimal instruction; the user has only to push the device in the direction of travel. Many adaptive canes have been used successfully by preschool children and adults with multiple impairments, but there have been limitations. Adaptive canes have been made of PVC pipe. They are not durable and often fall apart during use. The runners that slide along the ground wear quickly and are difficult to replace. Wheels, which are used instead of runners on some designs, do not function well on grass, sand, or other rough surfaces. Many adaptive canes have been and are still designed and manufactured by O&M specialists using available equipment and parts. These specialists determine the capabilities and needs of their clients but do not have experience in mechanical design and manufacturing which would enable them to build effective canes. A commercially available adaptive cane will significantly reduce material and personnel costs and will increase the design options by making it possible to purchase items in bulk and to customize parts.

METHODOLOGY

O&M specialists were interviewed by phone to determine positive and negative attributes of the AMDs they were using. This information was used to develop the VA's (Department of Veterans Affairs) AMD, which was field tested by 83 participants (18 elderly individuals; 28 people who were multiply impaired; 37 individuals who had previously used AMDs) across and outside the United States.

RESULTS

Fifty five percent of the elderly participants, 75 percent of the multiply impaired participants and 81 percent of the previous users planned to continue using their VA AMD. Sixty-seven percent of the elderly participants, 72 percent of the multiply impaired participants and 93 percent of the previous users rated the VA AMD as above average or better. Most clients' gait, travel safety and travel confidence improved, as rated by their O&M specialist.

Acknowledgment: Funding for this project was provided by the Department of Veterans Affairs, Rehabilitation Research and Development Service.

THE EDUCATION OF ORIENTATION AND MOBILITY INSTRUCTORS IN VICTORIA, AUSTRALIA

JANE ROSSITER

The Graduate Diploma in Orientation and Mobility (O&M) at La Trobe University, Victoria, has been conducted every 2 years since 1991. This was the first course in Australia to offer a university recognised qualification specifically in O&M.

The course has been jointly conducted and taught by the School of Behavioural Health Sciences and Agencies providing services to people with vision impairments in Victoria. Previously this included the Royal Guide Dogs Association of Australia and more recently the Royal Victorian Institute for the Blind and the Association for the Blind.

Applicants with a suitable academic background such as a degree in health or behavioural sciences are selected via application and interview.

The course itself consists of academic and practical components. Some of the subjects taught by university staff include Brain function and Kinesiology, Research Evaluation and Design and Interviewing and Communication Skills. Agency staff (who are trained and experienced O&M Instructors), are involved in teaching Theory of Orientation and Mobility along with the practicum component of the course, Professional Practice and Skills of O&M.

Theory of Orientation and Mobility covers a diverse range of topics including the design and construction of O&M programs for a variety of clients of differing ages and abilities, principals of functional assessment and training and the role of O&M Instructors in multi disciplinary teams.

The practicum part of the course is taught weekly throughout semesters 1 and 2 in addition to a series of three block placements. Practical classes utilise blindfold and low vision simulators. This allows students to gain insights into travelling with simulated vision loss in the context of becoming familiar with the process of teaching O&M skills. Instructors teach students the skills they will require. Students are then expected to teach each other O&M skills in a variety of environments ranging from simple to complex and dynamic.

Students involved in the course have the opportunity to complete an additional 10 weeks of supervised placement. Placement consists of 2 weeks mid term and 8 weeks at the end of the year, co-ordinated by the O&M Instructors involved in teaching on the course. Placement positions are offered by various Agencies providing O&M services to people with vision impairments throughout Australia. Placement offers students the opportunity to put theory into practise whilst under the supervision of a qualified O&M Instructor and also allows them to make contact with professionals in the field. Satisfactory completion of the Diploma and the

placement allow students to gain professional membership of the Orientation and Mobility Instructors Association of Australasia (OMIAA).

Evaluation of the course and placement is sought from students via written evaluation forms, participation in regular review forums and involvement of a student representative on the university course committee.

HAVING FUN WITH O & M
A NEW APPROACH TO ORIENTATION & MOBILITY TRAINING OF YOUNG VISUALLY HANDICAPPED CHILDREN

JACQUELINE DROGTROP
Visio
Huizen, The Netherlands

Recent years have brought major changes to Orientation & Mobility Training for young children. For one thing, O & M training now starts at a very young age. A start in the teaching of basic skills is made in the period before the children go to school. Even the stick is introduced at a much earlier age than before.

These developments require a different manner of working on the part of the mobility trainers, the early accompanists, the therapists teaching independence, and the teachers. In Visio, a new approach for O & M Training has been developed for young children.

The sheer joy of movement is the central theme in training. To be specific, the children are encouraged to move freely within the space available. O & M skills are then developed from this situation. Through the use of specific O & M games and songs the training is made attractive for the children. Among other things, the games focus upon sensory development, mobility training, the learning of basic O&M skills, the learning of various stick techniques, and the learning of orientation skills.

Many of the games make use of a variety of objects such as stools, boxes, large blocks, toys which make noises, and the playful use of environmental factors (e.g. listening to echoes or the following of guidelines etc). Many of the games and exercises are accompanied by O & M songs. In this way O & M is fun. The children learn their O & M skills while playing: skills they will need throughout the rest of their lives !

The poster sets out the structure of the programme as a whole, with the various O & M components which are incorporated in specific O & M games and songs.

O&M - NOT JUST THE CANE!

HANS KVARNSJÖ
LOTTA UNDEMAR
Tomteboda resourcecentre
Solna, Sweden.

Studies and inquiries made into the situation of visually impaired people in Sweden show that orientation and mobility is one of the most important skills for a good social integration. Those children and young people who in early age get the opportunity to develop their O&M and to get many experiences in this field, have a much better chance of being socially integrated, and this will lead to more contacts with mates and to a better ability to participate in different leisure activities.

We think that O&M is so much more than practising cane-technique and making environmental adaptations. It is just as much about motivating, creating self-esteem and practising the physical mobility and the motor skills.

Today we are working with eleven severally visually impaired children, aged 7 - 9. They have been divided into two groups. Practising in groups is a great advantage, as we see it; the children develop by comparing themselves to each other, and together they learn the basic social rules.

In a varied and playful programme where we, among other things, climb a climbing wall, jump on the special mat full of cushions and play in the pool, we develop the children's physical and motor ability. This ability is the basis of a satisfying O&M situation, which in turn leads to an increased independence.

DEVELOPMENT OF A HEALTH EDUCATION PROGRAMME FOR ELDERLY WITH AGE-RELATED MACULAR DEGENERATION-A FOCUS GROUP STUDY

S. DAHLIN-IVANOFF, (1,2) KI. KLEPP,(1) J. SJOSTRAND, (3)

1.Department of Ophthalmology, Institute of Clinical Neuroscience, University of Göteborg, Göteborg, Sweden
2.Department of Geriatric Medicine, Institute of Community Medicine, University of Göteborg, Göteborg, Sweden
3. Institute for Nutrition Research, University of Oslo, Oslo, Norway.

ABSTRACT
Age-related macular degeneration is a serious public health problem, and in most cases no cure exists. One available intervention is low vision rehabilitation, and there is a lack of programmes for the elderly. The purpose of this paper is to present the results of an evaluation of a group-based health education programme. This programme comprised six to eight 2-3-hour meetings, once a week, for persons with age-related macular degeneration. Each group consisted of four to six participants. The goal of the programme, which has its roots in the health belief model, was to sustain and restore the participants' performance of their daily activities. The tool used for process evaluation was focus group methodology, and eight focus groups were involved. Forty-five persons, whose average age was 80 years, took part in the evaluation. The results indicated that the participants were, on the whole, pleased with the content of the programme. There were, however, some indications that they did not understand all the information provided. Social support, regained hope and meeting others with the same disease were reported as positive aspects of the health education programme. The importance of the group leader's role in guiding this health education programme was emphasised. Furthermore, with regard to the composition of the groups, the participants pointed out that it was important to consider variation in visual acuity, so as to provide different models for comparison, and whether both sexes should participate in all groups. Finally, several suggestions for improving the programme are put forward.

THE ORIENTATION AND MOBILITY SPACE PROGRAM

ALVIN E. VOPATA

The Orientation and Mobility SPACE Program, as its title suggests, can be interpreted in more ways than one. It is a focused approach to viewing our students and clients in outdoor settings with at least a hint of exploring new possibilities for improving their learning experiences in those environments.

The focus in the SPACE Program is on pedestrian safety, with the letters S.P.A.C.E. meaning Safer Pedestrians Active in Community Environments.

Although a pedestrian safety approach may appear to be an intrinsic aspect of orientation and mobility instruction, we are putting our students at risk if we assume that we are already doing as much as we can to assure their safety.

This program, which is based on close to 30 years' experience in the field and extensive study of pedestrian safety, offers many possibilities for expanding our students' and clients' safe mobility.

AN INNOVATIVE PEDESTRIAN-ACTIVATED AND ALTERNATING AUDIBLE TRAFFIC SIGNAL

AGATHE RATELLE [1], CAROLE ZABIHAYLO [1], RAYMOND ALARIE [2], PAUL BARBER [3], RENÉE GEOFFROY [4], SYLVIE MATHIEU [4], JACQUES GRESSET [5]

[1] Institut Nazareth et Louis-Braille, Longueuil, Québec .

[2] Centre de réadaptation de l'Estrie, Sherbrooke, Québec.

[3] Montreal Association for the Blind, Montréal, Québec.

[4] Centre de réadaptation Le Bouclier, Repentigny, Québec.

[5] École d'Optométrie, Université de Montréal, Montréal, Québec.

Audible traffic signals (ATS) have been installed for many years in several countries to facilitate street crossings for visually handicapped persons. The use of audible traffic signals has been the subject of an in-depth study by orientation and mobility specialists working in vision Rehabilitation Centers in the Montreal region. An exhaustive study of various types of intersections was conducted in order to identify intersections where the installation of an ATS could be advantageous. Analysis of the risk level of using ATS was also conducted to define fundamental conditions to guarantee safety : no interpretation error, straight line of travel throughout the crossing, minimum risk of vehicular-pedestrian conflict. A new concept in ATS use was then developed in 1994 by Hall, Ratelle and Zabihaylo to meet these criteria. The concept includes specifications for operation, optimal acoustic characteristics of the ATS, and a traffic-control pattern that should accompany every installation.

In 1997, a study was conducted in order to examine the effectiveness of a pedestrian-activated alternating signal (modified Novax system) in a 6-lane-wide median T-shape intersection by a population of functionally blind persons. The purpose of the study was to evaluate the entire concept suggested by Hall, Ratelle and Zabihaylo in terms of safety, residual risk factor and training needs.

Twenty-four functionally blind subjects were asked to cross with a cane using an ATS until 3 consecutive successful crossings (out of 12) were completed. The success of each trial was determined by the attainment of six different criteria : localisation of the call-button, comprehension of the integrated code, repositioning at the corner ,departure time, straight line of travel during the crossing, crossing within time limit.

The majority of the subjects were able to use the ATS system (modified Novax) efficiently after only a short training time. Since the majority of subjects were able to accomplish the necessary tasks safely (activate the system, reposition at the street corner, start and cross within time limit and maintain a straight line of direction), we can consider the risk level with this system quite low.

SAN FRANCISCO: A NEW MECCA FOR BLIND TRAVELERS

THERESA POSTELLO,
Mobility & Wayfinding Consultants, San Francisco
JERRY KUNS,
“Jose Can You See” Blind Guided Walking Tours of SF
LINDA MYERS,
O&M Specialist, Consultant

The poster will illustrate and describe the Accessible City Project in San Francisco, in which remote infrared audible signs (the Talking Signs system®) are being used to label key features in public buildings, bus stops, public toilets, transit platforms, and transit stations. At intersections, Talking Signs® tell approaching users what street and block they are traveling on, and what direction they are traveling; when users are standing at a corner, and are within the crosswalk, they receive information about the current phase of the pedestrian cycle. The light cycle information is highly directional. Using the directionality of the audible signal, pedestrians are able to accurately align for street crossing, even at irregular intersections where traffic sounds are minimal or misleading. Talking Signs® receivers are being distributed by the Rose Resnick Lighthouse for the Blind for a nominal, refundable, security deposit.

At an interactive display, participants will have the opportunity to learn how to use remote infrared audible signs, and learn how to teach the use of the technology. Presenters will describe the process through which the City and County of San Francisco have become committed to providing this type of accessibility for persons who are unable to read print.

Handouts will describe applications of the technology, recent research on the use of the technology in transit stations, surface transit, and intersections, a curriculum for teaching the use of the technology, and the process by which transit systems develop and implement a remote infrared audible signage project.

PROBLEMS OF 0 & M IN CONGESTED COMMUNITY

ENOCK KABVINA
CHANCELLOR COLLGE
ZOMBA, MALAWI

When clients of usually impaired live in a congested community, there are a lot of problems that they encounter. Congestion in a community may include over crowding by people unplanned parking of cars and bicycles. Chancellor College is a vivid example of such a community. Corridors are congested by students during change of classes which takes place every one hour.

Visually impaired students face problems in such situations they even find difficulties to use their canes. Sympathsizers, (sighted guide) which in most cases are their sighted peers, just hold them by their hands and rush for classes. The client is usually looked at as if he is being pulled by sighted guide.

Sometimes, the client is merely avoided to be led by anybody, so he has to wait until the corridors are clear when he walks to the class and that means being late by some few minutes.

Orientation by using sound is not easy because such times (change of class) there is always a chorus of noise, so the client receives mixed sound.

Cars which are parked on unaccepted areas also become hazardous, to our clients, once they detect 2 or 3 cars on their way, they become confused and lose direction. It would be recommended if cars are by restriction parked in their specific parking areas.

Due to poverty in our country, a lot of people work here come by their push bicycles. Some of these are usually placed in corridors leaning against the wall. These are also hazardous to our clients.

Visually impaired students would appreciate if they are provided with a device which could produce sound when moving in such situations.

Modification of the environment to suit these clients is also vital.

S.H.A.R.P.
STUDENT HABILITATION AND RECREATION PROGRAM

SANDRA STIRNWEIS, MA, COMS
Foundation for Blind Children
1235 E. Harmont
Phoenix, AZ 85020 USA
SandraSt@JUNO.com

In the Phoenix metropolitan area, most blind and visually impaired children attend public school programs. Although they attend the classroom they often miss full participation in extracurricular activities such as physical education, music, and art.

S.H.A.R.P. began as a summer program held at a parent's house for ten to twelve children. Meanwhile grants were obtained to expand the program to a larger audience. Originally S.H.A.R.P. stood for Summer Habilitation and Recreation program. Children attended a four day a week, month long summer program of recreational opportunities including bowling, swimming, Goal Ball and games, along with daily living skills training. With each year the program expanded and the acronym changed to reflect these expansions.

Although the program is open to all school age children, most participants are between the ages of eight and 16. The requirements are simple: you must be able to follow group directions and be independent or willing to learn to be independent. Children who are new to the program are assisted by another child. This helps foster self esteem in the child offering assistance and deters too much dependence on adults for the new child. Children enjoy the opportunity to be in their own peer group of others who are blind and visually impaired where they are the only blind child among more than 300 students. Transportation is provided, bringing in children who would not be able to attend otherwise. Most of the program is provided at no cost to the parents and no child is ever turned away if they cannot pay. Parents and participates receive a monthly newsletter of activities to choose from. Staff is composed of the program director, van drivers and volunteers.

In its current incarnation, S.H.A.R.P. stands for Sports, Habilitation, Arts and Recreation Program. Along with the month long summer program is a school year based weekend program. Favorite activities among the more than 100 participants include rock climbing, white water rafting, hiking, camping, theatrical performances, two and three dimensional art forms, community service projects and cooking. The highlight of the S.H.A.R.P. program every year is a three day trip to California to experience the ocean (many for the first time) and thrill to amusement park rides.

TACTILE AWARENESS OF MEDICAL STUDENTS THROUGH THE PROCESS OF SENSORY AWAKENING

MASAKI MORIYAMA*, SHINYA YAMADA** AND SEIGOU INOUE*
*Department of Public Health, Fukuoka University School of Medicine
**Fukuoka National Rehabilitation Center For the Blind
Fukuoka, Japan

One of the authors (S.Y.), who has been working as a mobility trainer, has developed a new discipline of training called 'sensory awakening'. In this discipline, blind subjects are encouraged to develop their sensory awareness as they feel and explore their own daily living environment under the systematic guidance of a trainer. Although in the Japanese context this discipline is becoming more popular than the traditional instructive one, the process of awakening has not yet been studied systematically. Considering the trend towards an increase in the number of aged people, many of whom will lose their vision during their later age, there is an urgent need to clarify this process of awakening that will serve as a strategy to compensate for one's loss of visual perception and broaden one's ability to adapt to new situations.

The authors recruited ten sighted medical students to cooperate in an experiment that simulated the sudden loss of vision. The subjects were asked, while wearing an eye-mask, to use only their hands to explore a given object. After the first 30 seconds, the students were asked to write down their findings. The subjects then continued their exploration for an additional 90 seconds and further reported their findings.

According to the subjects' self-reported records, two types of awareness occurred during the process of exploration: sudden and/or progressive awareness. Exploration of most of the simple tools in daily use led to a sudden awareness which subjects reported as the sudden appearance of a clear mental image of the given object. Exploring uncommon tools and/or ornaments led to a progressive awareness where subjects progressively built up the image of the given object using their tactile sense. During exploration, the surface characteristics of the objects were most frequently reported alongside their material-based characteristics to portray and describe the object. After a lapse of time, the initially obtained pieces of information was further connected so that the specific identity of the given object became progressively clearer. Most subjects described the overall shape of the object in relation to their hands. The perceived weight was used to predict the use of the object. Some subjects also mentioned other dimensions such as color and degree of transparency.

The medical students responded to the sensory awakening process and became aware of the integrated nature of tactile perception. This finding is important not only for understanding the basis of the sensory awakening process but also for widening the range of understanding shared by health-care providers and their visually impaired patients.

ORIENTATION OF A GUIDE DOG TEAM

CHARLES FARRUGIA, MARC GILLARD, KEITH TOMLINSON
Guide Dogs for the Blind, Inc.
San Rafael, California

Guide dog handlers have an ongoing need to be oriented to new, unique or challenging routes, depending on the demands of their lives. Orientation and Mobility Specialists are often enlisted to provide this service, although they may have little formal experience with guide dog teams. Working with a guide dog team can be markedly different from working with a person using a long cane. Guide Dogs for the Blind, Inc. has developed a 3fi day seminar for O&M Specialists to increase the participants' theoretical and practical knowledge for providing orientation to guide dog teams.

A primary element explored during the seminar is the student-dog matching process, which occurs in the first week of training and takes into account physical and behavioral characteristics of the handler and dog. It is critical that a person is matched with a dog that he or she can control consistently over time. Lack of physical control can result in a dog pursuing its own interests and instinctive drives. Handler and dog should feel comfortable working together, and the dog should complement the handler's gait and pace while providing a sufficient lead to maintain direction and transfer environmental information. A handler's capability, experience, motivation, and capacity for leadership of the team are important factors for successful independent travel with a guide dog. Additional considerations in the matching process include the handler's O&M skills, travel environments and the dog's abilities and needs. A dog's level of affection, degree of dominance toward people and dogs, and motivation and initiative during guide work are also given weight in the match-making decision.

Another component of the seminar emphasizes how guide dogs are motivated by the anticipation of arriving at a destination and receiving praise. The dog's ability to recognize a destination can aid the process of locating objectives within a route. Dogs vary in their ability to remember particular objectives, but with practice will eventually identify them with minimal support from the handler. It is important that a guide dog learns the correct route the first time out. An initial orientation lesson with the client using a long cane without the dog is an option for complex routes. A session going sighted guide with the dog at "heel", exposes it to the route without the responsibility to guide. Ultimately the O&M Specialist walks behind and to the right of the team, providing commentary on the environment and giving cues for identifying and reinforcing objectives that lead to a destination. Repetition builds route retention and independence for the team as the O&M Specialist eventually observes from a more remote position. With each successful practice it is important for the team to relax after reaching a destination, to provide a sense of completion for the dog. Once the guide dog shows initiative toward the destination and the handler recognizes the cue and provides praise, the training exercise can be concluded.

TACTILE COLOUR

LOIS LAWRIE
1329 DENMAM STREET.
VICTORIA. BC. CANADA. V8R 1X4
E-mail smallfry@pacificcoast.net

We would like to Make you aware of Tactile Colour Communication, a non-profit society in Canada and a registered charity in the UK. Tactile Colour is a new system of twelve bold screen printed, textured colours that enable people to identify colours by touch and are predominantly printed on self-adhesive sheets.

Tactile Colour allows people with a visual impairment to access information also displayed in colour and therefore offers more integration between the blind and sighted worlds. Applications include educational aides, geographical and mobility maps, art work,. jigsaw puzzles and greetings cards available with raised print or Braille. We are also researching ways of extending this new medium into plastics for toy making, floor coverings and way finding systems (The UK's London Transport, Unit For Disabled Passengers have commissioned three prototype 'tube' maps).

WHAT CAN IT BE USED FOR?

- Individuals can use the sheet vinyl to make pictures, maps, labeling systems and games. Large scale mobility maps can be created for specific locations and used in conjunction with markers and audio information for way finding systems.
- Sighted and visually impaired people in educational and social settings can communicate visual ideas in a tactile format for greater integration
- Multiple copies of maps, greeting cards, pictures, games, etc., can be printed in several textured colours.

WHAT'S AVAILABLE IN TACTILE COLOUR?

Self-adhesive vinyl sheets in 12 colours in various sizes.
Colour identification cards with raised print and Braille.
Greeting cards.
Shaped identification stickers.
Jigsaw puzzles.
Maps to order.
Prototypes for trials.

Tactile Colour has been selected as a Design Council "Millennium Product" in the UK

If you have any interest, suggestions or questions concerning Tactile Colour Lois Lawrie, chairperson, will be happy to talk to you at the poster session or contact us at the above address. N.B. Free sample packs are available on request.

IDENTIFICATION OF DIFFICULTIES OF THE INDEPENDENT BLIND TRAVELERS TO CROSS INTERSECTION WITH/WITHOUT AUDIBLE TRAFFIC SIGNALS

TAKUMA MURAKAMI, MITSUHIDE ISHIKAWA*, MOTOHIRO OHKURA~, HAJIME SAWAI+, JINRO TAKATO+, AND MASAKI TAUCHI+

Tokyo Metropolitan Rehabilitation Center, Shinjuku-ku, Tokyo 162-0052 Japan, * Shitsumeisha Koseikan Rehabilitation Center, Shinjuku-ku, Tokyo 162 Japan, ~ College of Technology, Seikei University, Musashino, Tokyo 180-0001 Japan, + Department of Welfare and Social Service, Okayama Prefectural University, Soja-shi, Okayama 719-1197 Japan

INTRODUCTION

To date, the audible traffic signal (ATS) for the blind pedestrian to cross intersection is prevalent in many countries. Their primary function is to inform the users the phase of 'walk' of the pedestrian light signal by certain kinds of sound. Although it is very useful for them to take timing to start walking, there may be many other tasks that are necessary to ensure crossing intersection in safe. To identify general tasks that would be necessary for them when they cross intersection with or without ATS, we carried out questionnaire survey from blind and visually impaired persons who walk alone.

METHODS

The questionnaire that consists of 38 questions concerning attribute of subjects, O&M training history, frequency of independent travel, how to walk crosswalk, how to use ATS and so on was sent to Mobility and Orientation trainers (O&M trainers) of four different cities in Japan. In total fifty subjects who often go out by themselves were selected for this survey. The each subject were interviewed by O&M trainers and the answers were written by O&M trainers.

RESULTS & DISCUSSION

In the intersections without ATS, the troubles by which blind traveler might have difficulty were as follows. 1) to locate crosswalk (78%), 2) to know the presence of pedestrian light signal (62%), 3) to find a boundary line between sidewalk and traffic lane (58%), 4) to take a timing to start (46%). The matters that they are strained in the intersections without ATS were, 1) to finish crossing while the walk (green) light signal is turned on (56%), 2) veering (50%), 3) to identify and maintain the direction to walk (36%), 4) to take a timing to start (30%). In the intersections equipped with ATS, they also mentioned some difficulties concerning direction taking at the starting position and keeping direction while walking in the crosswalk, and restlessness for finishing within the limited time of "walk" signal. The results suggest that blind street-crossers need some navigation cues, which cannot be provided by the present ATS.

THE ROLE OF THE VISION IMPAIRMENT SPECIALIST IN THE REHABILITATION OF PEOPLE EXPERIENCING MONOCULAR VISION IMPAIRMENT

JORGE LOPEZ
Guide Dogs for the Blind Association of Queensland
Brisbane, Australia

Monocular Vision Impairment (MVI), is defined as having less than 6/60 visual acuity in one eye with adequate vision in the other. Most people affected by this condition experience a number of severe consequences resulting from their loss, on many occasions lifestyles are of necessity changed.

MVI results in people experiencing a reduction in the field of vision (20 to 40 degrees) and difficulties in judging distances accurately due to their loss of depth perception. Independent mobility and daily living activities are affected, particularly within the one meter range of vision where most close up work is performed. A review of the literature, however, has shown that most rehabilitation texts do not discuss MVI. Surprisingly, more often than not, rehabilitation issues are hardly mentioned (Schein, 88; Brady, 94).

According to Schein (88), rehabilitation professionals quite often discount the economic and psycho-social consequences of acquired MVI, and see it more like an inconvenience than a real disability. This discrepancy between the professional and the person affected by MVI, can have a great impact in the total process of rehabilitation often resulting in a person's ability to cope, regain independence and come to terms with her/his vision loss.

In the past, people affected by MVI rarely approached services for the blind and vision impaired in Queensland, when they did, only limited support was offered. People were not only assessed as having too much useful sight to qualify for their services, the agencies' experience in the rehabilitation of people with MVI was very limited.

Since 1993 however, Guide Dogs for the Blind Association of Queensland (GDBAQ) established a Telelink Program. The aim being to link people experiencing a similar condition thereby enabling them exchange ideas and receive information and emotional support under the coordination of the association's psychologist.

This paper discusses various rehabilitation procedures used by GDBAQ's staff in the rehabilitation of people affected by MVI (Counseling; Resource information; Skill training; Community education). In addition, the lack of understanding generally of the disability.

A FIRST MAPPING OF LOW VISION SERVICES DIVIDED AT THE VISUAL REHABILITATION CENTER IN TALLINN

ENE KELK
Visual Rehabilitation Center in Tallinn, Estonia

This reported research study is the description of the effects of the service assistance given for the school children (age 7 to 16) at the Visual Rehabilitation Center in Tallinn. The low vision care in Estonia is provided only through the Visual Rehabilitation Center (VRC), that is situated in the same building with the Central Eye Clinic.

The questionnaires were sent to the sample group (20 children and their parents) in order to investigate the effects of assistance given via Visual Rehabilitation Center. The interviews among the staff of the VRC were made as additional source of information.

The *objectives* of this report are:
1. to provide the information which will enable the VRC to evaluate, promote and develop its services;
2. to identify the problems in obtaining the information about the services or access to them;
3. to provide a national picture of the main characteristics of the integrated visually impaired children;
4. to examine how the needs of visually impaired children are met from whatever sources, including other service providers;
5. to provide the information on the education process, looking at the needs of the children as well their parents.

As a conclusion to this discussion it can be stated that the way in which the VRC has provided the assessment and assistance to the children with low vision, is definitely successful and contributes the client's quality of life in a positive way.

As all of the assessed children are integrated into the ordinary schools, then the VRC is one place in Estonia where they get help for all their problems that are connected with their low vision.

THE DELIVERY OF O&M SERVICES IN ATLANTIC CANADA

TOM ATTEBERY AND SANDRA HODGSON

The four Atlantic Provinces (New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland), offer a unique challenge to Orientation and Mobility Instructors (O&M), due to the geographic distribution of students and the number of students being served. The Atlantic Provinces Special Education Authority (APSEA) provides O&M services to over seven hundred children (ages birth to twenty one), in an area of 211,000 square kilometres. Four types of O&M services: assessment, direct instruction, consultation and intensive short-term training are provided.

A child is first assessed to determine his/her ability in various areas (e.g., concepts, pedestrian safety, cane skills, use of low vision). Skill areas that require development are identified and recommendations for the O&M program are then made. Assessment of a student's O&M skills by O&M staff can be arranged in the home area. An O&M assessment may also be part of a comprehensive or vocational assessment at the APSEA Centre, located in Halifax, Nova Scotia.

O&M staff are available to assist staff, parents and others working with any student with orientation and mobility needs, both in the APSEA Centre residential setting and in the child's home community. O&M staff work with itinerant teachers to assess and help develop O&M programs for children attending school in their home area. In services with teachers and parents are available upon request.

Many children with visual impairments, who are enrolled in their local schools, receive O&M as part of their education program. O&M lessons are carried out by itinerant teachers in consultation with O&M staff. Students attending the APSEA Centre in Halifax may receive O&M instruction from Resource Centre based O&M staff. Specific goals are included on the child's Individualized Education Program.

Some of the special needs of the children with visual impairments can be difficult to address in public school settings. Short-term placement programs at the APSEA Centre are designed to provide an intense level of instruction based on each student's identified needs. The length of the program varies. A positive aspect of all short-term placements is the opportunity it provides for students to meet other students who are facing similar challenges and mastering some of the same skills. Parents and itinerant teachers are encouraged to be active participants in short-term program planning, implementation and follow-up.

The orientation and mobility needs of the blind and visually impaired students, in the Atlantic Provinces, are met through a combination of assessment, direct instruction, consultation and intensive short-term training. Collaboration with itinerant teachers, parents and additional school staff make the delivery of O&M services in our region possible.

COMBINING O&M AND REHABILITATION TRAINING WITH TEACHING THE DANISH LANGUAGE TO REFUGEES AND IMMIGRANTS. HOW CAN THIS BE SUCCESSFUL?

LONE DYEKJÆR
Educational Department
The Institute for the Blind and Partially Sighted
DK-2900 Hellerup, Denmark

At the Institute, experience has been gained teaching Danish, O&M and Rehabilitation (ADL) to refugees and immigrants since 1993.

To date, *Danish for Foreigners*, has enrolled 38 students from 16 different countries, of which the majority have been refugees. Students have come to the program with various levels of sight and language, from total blindness to good residual vision and from no Danish language skills to “Danish Language Test 2” (the prerequisite for entry to further education).

The primary focus of the program, has been to integrate teaching of Danish in combination with subjects such as O&M and ADL. By combining language training and physical activity, the student can learn the language while learning the other subject at the same time. For example, in an O&M lesson, when walking down the stairs, the student is taught how to say related phrases in Danish. With the main objective being to learn Danish, a language teacher and a subject teacher work closely in planning each lesson in order to provide a genuine, meaningful and functional communication.

Because this method has several problem areas relating to the differences in the students prerequisites, the question is, whether this teaching method is always successful in O&M or ADL? Is the student just beginning to learn the language, has he/she recently become visually impaired, does the student have a very different cultural background or is he/she an immigrant or refugee?

Teaching ADL and O&M to refugees and immigrants requires understanding of the views and ideas of other cultures. Therefore, an interview with the student, and often the family, must form the basis for the planning of aims and objectives for the course. Is there a real desire to be independently mobile? Experience shows that it is difficult to both learn a language and O&M/ADL techniques at the same time, as both subjects require psychological readiness and abstract thinking. The instructors must be very aware of the differences in the students prerequisites when planning the lessons. Furthermore, top priority cannot be given to the language lesson, as ADL and O&M are essential subjects to visually impaired people. These subjects have dual objectives with equal priority.

Conclusion: It takes good Danish skills to be successful in learning O&M and ADL. For beginners, who have recently become visually impaired or have very different cultural backgrounds, the method is not suitable. It is simply too difficult to learn a language along with identifying yourself as a visually impaired person in a country, where everything is completely different. However, for other combinations in student prerequisites, the method can be successful. If the teacher is both an O&M/ADL instructor and a language teacher, there are very good possibilities for working with this method.

PERSONAL PROMOTION AND ORIENTATION COMMITTEE

CRISTINA GONZALEZ MOYA
Director C. R. Sabadell

OBJECTIVES

This commission has the following objectives:

1. Evaluate the attitudes interests and possibilities of blind and visually impaired people who take part in the Integral Habilitation-Rehabilitation programme in this centre, in order to channel their immediate future (professional, social and family) and achieve integration in the short term, avoiding diversions which affect motivation and reduce real expectations.
2. Simultaneously establish the relevant contacts with local teams and the street furniture/teams and all those things which affect the surroundings of the visually impaired
3. Exhaustively inform the visually impaired of the diverse professional and academic possibilities which exist at present.

CONCLUSIONS

This commission has an important specific weight in the field of rehabilitation and, more concretely, in the field of real application of rehabilitation techniques. We understand social, academic and workplace integration as a guarantee of the maintenance of the rehabilitation techniques acquired. We start from the premise that personal autonomy is a dynamic process, which must have a vocational and social projection.

Our experience has demonstrated that a very high percentage of people that work, study or in some way modify their social environment are constantly potentialising their autonomy.

MODES OF INTERVENTION IN RESPECT TO INTEGRAL REHABILITATION: FINAL OBJECTIVE: THE FULL INTEGRATION OF THE BLIND OR VISUALLY IMPAIRED PERSON IN SOCIETY

CRISTINA GONZALEZ MOYA
Director C. R. Sabadell

OBJECTIVES:

1. Adjust the programme of rehabilitation to the real needs of the individual.

   These real needs have to be detected by an evaluation team. These needs should be manifestly expressed by the individual and meet the requirements of information and motivation and should be contextualised within the socio-famliliar circumstances of the individual.

2. Optimise the human and material resources of intervention, in function of the capacity of the individual.

   In order to undertake any mode of intervention the motivation of the visually impaired person has to be borne in mind, the real motivation which adjusts to the expectations, needs and possibilities of both the environment and the individual.

MODES OF INTERVENTION

1. ENVIRONMENTAL PROGRAMME: Characteristics, requirements, concrete needs and/or family/social intervention.

These programmes are applied when the interests of the visually impaired person are exclusively linked to the areas of Orientation, Mobility and Abilities in Daily Life and/or Psychological

Attention. In these cases the Centre acts as a macro-team for basic attention. being the Centre's Technicians in Basic Rehabilitation that would travel to the environment of the member.

These programmes which allow learning to be undertaken in concrete places, where the visually impaired person is going to live out their daily life, have the advantage of when circumstances allow the proximity of the family. At the same time these are well suited to those persons that lack the capacity of generalisation or in those programmes that are very concrete.

2. MIXED PROGRAMMES: Characteristics, specific requirements, generic aspects, group characteristics, environmental characteristics, social and/or family intervention.

These programmes are applied to those visually impaired people that undertake an intensive and global training during an initial phase that is as brief as possible, in order to achieve adaptation to blindness, acceptation of the stick, basic teaming of communication and TIFLOtechnology, and according to case, visual rehabilitation .... and continuing from this a programme in the area in which the person lives is developed, and it is in this second stage our technicians will travel to their environment.

This mode, recently implanted, offers extremely interesting possibilities, given that the blind or visually impaired person receives the impulse of the collective, that is to say people in similar circumstances. What is more, in this first phase basic aspects are worked upon in an intensive and global way. This dynamic initial impulse is projected into the environment of the individual and adjusts to their real needs.

Thus, the mode offers the advantages of residential intervention combined with the advantages of environmental intervention.

However, in the case of recent blindness, for example, it is advisable to prolong the initial stage potentialising the intensive and global group work that favours self-confidence. Although the intervention is in group form the programme is individualised. Adapted to interests, capacities and needs.

3. RESIDENITIAL PROGRAMME: Characteristics, requirements, close co-ordination with the resources of the area, direct and deferred family/social intervention.

These programmes are applied whenever the capacity for generalisation of the visually impaired person allows, and are undertaken integrally in the Centre, with the need for final adjustment by the area team which is contacted both previous to and at the end of the programme. In these cases the Centre is simply another link in the chain of rehabilitation, without losing sight of the fact that, as with any dynamic process. the pertaining follow-up is necessary.

The residential programmes are especially suited to members with urgent needs to learn the greatest number of abilities in the shortest time possible, and in those cases where the members reside some distance from the Basic Attention Teams or whose family environment is not best suited to teaming and maintaining the techniques. At the same time these programmes are recommended for those people whose psychological, social and/or working circumstances require immediate intervention or those who may be gravely affected by a prolonged waiting period.

In both these programmes and the mixed programmes. the Centre offers:

- Intensive programmes: the best use of a minimum time period.
- Global programmes: simultaneous and coordinated work in the areas.
- Individualised programmes: adapted to each individual.
- A stimulating atmosphere, rich in experiences.

- Real training situations.
- The realisation of rehabilitation 24 hours a day, given that all the personnel favour the putting into practice of the abilities which, little by little, are acquired.
- Having to confront situations without the protection or over-protection of the environment.
- Situations are faced alone and they realise their possibilities without the pressure of the environment.
- Orientation and assessment of the possible social, working and educational alternatives in contact with the Basic Attention Teams of the area.
- Help in maintaining emotional stability through intensive activity.

Having to live during an initial period with -6sually impaired people provides:
- Overcoming of isolation
- The exchange of feelings, experiences. and personal problems which allows objective understanding of situations which were lived as unique and exclusive.
- Different life experiences to those which are offered by the family environment, which helps with personal enrichment.
- The feeling of being supported by people with similar problems.

CONCLUSIONS

When this centre decides to put into operation the three modes of intervention, it is because it is thought that they are all necessary and the important thing is to determine which people and which circumstances require one or other of the modes. Experience has shown us that an adequate focus provides better results and in the long run better maintenance of the techniques acquired.

Flexibility is a maxim in our Centre and efforts are made daily to adjust to the individuals reality and the ever more complex circumstances require from us a constant effort of individualisation and actualisation.

We have wished to demonstrate our experience with the firm belief that Rehabilitation is a dynamic process that demands of the professional a constant vigilance so that the visually impaired can:

- Value their potential and be conscious of their possibilities and limitations.
- Have personal initiatives that are potentialised by those around them in the most adequate environment.
- Achieve personal resources to confront overprotective or compassionate situations in their environment, which will lead to greater confidence and security.
- Undertake activities without family and social pressures.
- More independence and self-sufficiency at all levels.
- Reach a higher level of normalisation, which helps a correct integration in society. In these few words, our principle objective.

ADAPTIVE MOBILITY DEVICES

CAROL DANCEY
CAROLINA MARTINEZ
Texas School for the Blind and Visually Impaired
1100 West 45th Street
Austin, Texas 78756-3494
USA

Some visually and multiply impaired students can become at least semi-independent travelers through the use of the adaptive mobility devices (AMD). These devices are being use d with success with some students to bridge the gap between basic skills and cane travel. They can promote concept development, problem solving, and self confidence.
Some students may demonstrate a lack of motivation and interest when assessed with an AMD. An age-appropriate object (e.g., push toy, baby buggy, shopping cart) that is motivating to the student may be use to develop the skills needed for the transition to an AMD and, for most students, ultimately to a long cane. Many students can transition quickly (6 months to a year) to the use of a long cane. Some students, however, may use the adaptive mobility device as a life long tool.

Factors to consider when to use an adaptive mobility device:

• Does the student have a severe physical or cognitive disability that interferes with his disability to protect himself with a cane?

If the student is not able to learn a protective cane technique at the present time, he may benefit from the protection offered by an AMD which may provide more security while moving through space.

• Does the student have deficits in proprioception and kinesthesia that interfere with his ability to protect himself with a cane?

Some students are unable to safely protect themselves with diagonal technique or an arc, even when these have been offered in a modified form. The use of an AMD and the transition to the use of a cane incorporates motor memory which may improve the student's appropriate functioning with the cane.

• Is the device socially appropriate for the student's age and environment?

The O&M Specialist needs to consider the acceptance of the device by the student, family members, peers, and school personnel when making a decision regarding a mobility device.

WEST VIRGINIA LOW VISION DRIVING STUDY
1985 - 1995
RESULTS AND CONCLUSIONS

CHUCK HUSS
West Virginia Division of Rehabilitation Services
West Virginia Rehabilitation Services
P. O. Box 1004
Institute, West Virginia 25112

Between 1985 and 1995, a multidisciplinary group of researchers at the West Virginia Rehabilitation Center, Institute, West Virginia, set out to explore and formulate ways of screening, training and assessing a select group of visually challenged individuals who wanted to learn how to drive a motor vehicle.

This poster board presentation will provide in part background information on:

1. Rationale, objectives and action plan for this study;
2. Visual requirements for candidates selected for inclusion in this study;
3. Initial screening areas and staff who served as evaluators;
4. Concurrent training strategies incorporated;
5. Standardized driver assessment measures used with respective student drivers.

Key results and conclusions will then be shared, including reference to:

1. Demographics of the study's population sample (pre and post training);
2. Students' visual scanning skill deficits which were remediated with appropriate training;
3. Pre-driver readiness skills;
4. Positive outcomes of using standardized on-road driver performance measures;
5. Driving records and vocational pursuits of project graduates;
6. Dissemination of project results and conclusions including reference materials and inservice training for other professionals interested in starting low vision driver education training programs.

Monday, July 6 morning

THE CULTURE OF REHABILITATION: AN INTERNATIONAL PERSPECTIVE

STEVEN J. LA GROW
School of Health Sciences, Massey University
Palmerston North, New Zealand

I'm honored and more than a bit humbled to be addressing this group on the 'culture of rehabilitation' as it relates to the practices, beliefs and values which underlie rehabilitation services for visually impaired persons in general and the provision of orientation and mobility (O&M) services specifically. In doing so, I think its only fitting to take an international perspective on this issue in order to recognize both the theme of this conference and the ever expanding arena in which our services are provided.

It has taken me 10 years to get to the point of this address and I'm delighted to finally be making it here in Atlanta at the 9th International Mobility Conference. I can think of no better place to present this particular paper than at an International Mobility Conference. And, to do so here in Atlanta is especially relevant for me, since it was here that I started my career as a mobility instructor 22 years ago. Thus, to say that I am pleased to be making this address may be a bit of an understatement.

I started thinking about this topic back in 1988 when I first arrived in New Zealand, where I currently live and work. I went there to set up that country's first professional preparation programme for O&M instructors at Massey University. The O&M programme was established as a speciality area within an 'Endorsement in the Rehabilitation of the visually Impaired' to their existing Post Graduate Diploma in Rehabilitation.

In designing this programme, I consciously modeled it after the one offered at Western Michigan University, where I had taught previously. I also adhered closely to the 'University Personnel Preparation Guidelines for Accreditation of University Programs' put out by the Association for the Education and Rehabilitation of the Blind and Visually Impaired (AER) in order to meet their standards since part of my charge was to develop an internationally recognized programme with a transportable qualification. This latter was to be accomplished by ensuring that our graduates were eligible for AER certification.

After being at Massey for a short time, I was told that "I was doing a great job, keep up the good work, and oh, by the way, don't forget to adhere to the terms of the Treaty of Waitangi by ensuring that your programme is as culturally relevant to the Maori as it is to the Pakeha who are the majority population in this country". My blood ran cold! I knew who the Maori were.

They were the indigenous people of New Zealand, the *tangata whenua*, the *people of the land*, I knew who the *pakeha* were, they were basically every body else. They make up about 88% of the population and represent a melting pot of immigrants from around the world but with a very heavy dose of British ancestry. I knew what the Treaty of Waitangi was. It was the treaty signed between the Maori tribes and the British Crown in 1840 which marked the birth of New Zealand as a modern nation-state. I also knew that the treaty gave the Maori the right of equal partnership with the rest of New Zealanders, regardless of their numbers. I even knew that inherent in this partnership is the right to culturally relevant social services for Maori people (Vasil, 1987; Durie, 1990). What I didn't know was what was either relevant or not relevant about our current systems. Rehabilitation, after all, seemed to me to be pretty relevant to anyone experiencing the onset of a significant disability. I simply did not know what culture had to do with it, nor did I feel like I was the one to address this question.

I knew a few Maori but certainly didn't know much about their culture, beliefs or values. However, be that as it may, it seems that this was my charge and I was expected to do something about it. Therefore, I undertook a crash course in Maori culture. I must say it was fascinating experience, but it only became truly relevant for my purposes when I began to realize that to understand this question of cultural relevance I had to juxtapose Maori culture with that of the 'culture of rehabilitation'. Yet, I also found that, to that point, I had not been consciously aware that such a culture existed. Thus, I found, that I had as much to learn about the culture of rehabilitation as I did the Maori culture.

I soon learned that rehabilitation has a distinct culture as do other fields of endeavour and professional groupings. Although we are not always cognizant of that culture, it does effect the way we function within our profession, what we believe to be true and value, the way be organize and provide our services and even the way we relate to our clients (Lowrey, 1987). The culture of rehabilitation, although largely the product of western culture. is unique in the sense that it is a product of the values of those who founded it (health and allied health professionals), of the beliefs of the time in which it evolved (primarily reflecting post world war II optimism), as well as. the national cultures which most influenced it (North American, British, Western European and Scandinavian). These values and beliefs have been passed along from generation to generation of rehabilitation practitioner and are reflected in the goal and practices of our profession.

The goal of rehabilitation, for example, has traditionally been to gain as much personal independence in daily life as possible. This goal is reflected in the definition of rehabilitation contained in 'The Standard Rules on the Equalization of Opportunities for Persons with Disabilities' adopted by the United Nations General Assembly in 1993. These rules define rehabilitation as "a process aimed at enabling persons with disabilities to reach and maintain their optimal physical, sensory, intellectual, psychiatric and/or social functional levels, thus providing them with the tools to change their lives towards a higher level of independence" (United Nations, 1994, p. 11).

Rehabilitation programmes for persons who are blind or visually impaired place a particularly strong emphasis on the restoration of personal independence for their clientele (Nelson et al.,

1992). The effectiveness of most of the direct and specialised services provided for this population are, in fact, evaluated in relation to the degree of independence gained by their clients. The ultimate goal for orientation and mobility (O&M) services, for example, is said to be "to enable the student to enter any environment, familiar or unfamiliar, and to function safely, efficiently, gracefully, and independently by utilizing a combination of these two skills" (Hill & Ponder, 1976, p. 1).

This 'ultimate' goal is often seen as the end of a continuum of functional ability which progresses somewhat unevenly from simple route travel in familiar indoor environments to independent travel in unfamiliar, urban environments. Goals may be specified anywhere along this continuum to reflect individual need and ability (La Grow & Weessies, 1994). However, it is generally agreed that independence in travel represents the desirable end of the continuum and the farther along the continuum one gets the better (Jacobson, 1993; La Grow & Weessies, 1994).

When interdependence has been identified as the ideal to be achieved through O&M instruction, it has been defined as the art of "knowing one's limitations and seeking and using assistance from others as the situation warrants" (Jacobson, 1993, p. 7). "Knowing how to rely on or gain help from others" is then praised as being "the real sign of independence" (1993, p. 7). Thus, it seems, that no matter how we name or define it, independence is indeed seen as the ultimate or most valued goal of O&M by the O&M profession.

Yet, it must be understood that this is a culturally laden judgement and not necessarily one that all people hold to be self-evident. The Maori, for example, view themselves as a part of a collective made up of a family and community. Interdependence and harmonious relationships are prized. They are not seen as a means to gain greater independence but rather a firmer connection with the communal being. Independence, so highly valued in the rehabilitation culture, is often regarded as a sign of immaturity and irresponsibility (Durie, 1984: 1990). It is not valued but considered dysfunctional and disruptive. Likewise, in some Aboriginal communities in Australia supports beyond that provided by the extended family are not seen as relevant and therefore goals such as individual independence are not a priority. In fact, such a goal may be viewed as an attempt to isolate the individual from the family and break a basic value of aboriginal life (Gething, 1995). Independence in the Western sense is also a difficult concept for the rural Asian to understand. Homogeneity is the preferred life style. To be independent in the Western sense is considered a highly 'undesirable' attribute (Horton, 1988, p. 256).

In fact, the emphasis placed on independence by our professional culture, may be disproportionate to that considered healthy by many western cultures as well. A good example of this may be found by the uproar raised in New Zealand recently when a severely disabled woman died tragically in her bed a few days after her disabled husband and co-caregiver had passed away. Without him, she was unable to reach a phone to call for help and had no infrastructure of support to call upon her. This lack of support was by choice as the couple had been determined to prove their independence. This tragedy sparked calls from around the nation for peo-

ple with disabilities to acknowledge interdependence as a valued state of being within a mature and caring society ("Risks of Independence", 1997).

The professional culture we adhere to also effects the way we organize the systems and practices we use to provide our services. The culture of rehabilitation, for example, is characterized by a system of individualized service which is linear and future oriented, sequential and compartmentalised, scientific and objective. Services are delivered by teams of specialists, written plans are developed, goals are future oriented, and change is achieved through direct intervention (Lowrey, 1987).

Such a system, I came to realise, is in direct contrast with Maori culture (Durie, 1990), and presumably many other non-western cultures as well (Forman, 1990; Hilton, Ellis, Genwright, Miller & Stern, 1992; Horton, 1988; Glynn, 1993). However, it is this system that most of us recognize as epitomizing O&M instruction. We are O&M specialists. We function within a multidisciplinary team. We provide an individualized service delivered on a one-to-one basis, and we seek to enable our clients to become as independent as possible. We are also predominantly from western cultures and have been systematically instructed in the values and practices of our professional culture. We must, however, begin to realise that much of what we believe to be integral to O&M is in fact a product of our own unique professional culture and the cultures in which we were raised. In doing so, we may begin to separate cultural values from the actual task involved in non-visual travel or the way it may be best taught. To do so, we cannot simply view O&M I as consisting of a culturally neutral set of skills which can be incorporated into others' lives without violating their belief system. Rather, a culturally appropriate approach which recognizes, incorporates and respects these values is required. Thus, it is important to see O&M, as it is usually practiced and has been taught to us, to be a product of a specific professional culture and to then juxtapose that culture to that of those we seek to serve. In doing so, we may begin to appreciate what is and is not culturally relevant about our goals, approaches and practice.

Rehabilitation services including O&M will not be relevant to Maori, for example, unless and until (a) the spiritual basis to health and disability receive sufficient attention, (b) the Maori view of personal identity, which includes the extended family and the tribe is recognized, (c) the fundamental importance and complexities of these extended relationships are appreciated, and (d) the values of the people being served are accepted as relevant to the rehabilitation process itself (Tibble, 1990; Durie, 1988; 1990). Thus, the provision of O&M training as something that focuses simply on a series of skills required for non-visual travel is not appropriate, nor is our practice of one-to-one instruction always acceptable. Rather, mobility must be seen as part of the person's entire life which includes the spiritual, the mental, the family, and the physical (Tibble, 1990). To the Maori, one's well being requires these four aspects to be in balance. They are not seen as separate entities, thus they cannot be 'worked on' separately then fitted all back into the whole. They are integrated and one. As the individual is with the group. Thus, the provision of services by a group of specialists, including counsellors, mobility instructors, rehabilitation teachers and vocational advisors, each concentrating on one aspect of an individual's life, is not culturally relevant to the Maori. Rather, a more general and holistic approach is favored.

Parallels may be made with the Aboriginal people of Australia as well. Services which do not account for the spiritual or cultural aspect of the individual but just focus on functional or physical skills required to overcome a disability, for example, often result in a sense of alienation and irrelevance for the individual served. As a result, many Aboriginal people with a disability do not acknowledge that they have a disability (Bostock, 1991). Thus, a more comprehensive approach recognizing the culture and the community is required. Professionalism and specialisation is not valued and individualized instruction may be suspect.

The Community-Based Rehabilitation Model (CBR) developed in Asia addressed many of the issues raised here. These programmes usually provide short-term training courses for rehabilitation workers recruited from rural villages (Horton, 1988). These workers are generally trained in O&M, activities of daily living, basic education, gardening skills, arts and crafts, and at times work skills. They do not specialize in a particular area, nor do they work in multidisciplinary teams. Rather, upon completion of their training they return to their villages as field workers. The field worker provides services to the individual through the family and extended family group. The family is involved in all stages of the rehabilitation process from the planning to the actual provision of the services required. "The goal of rehabilitation in the CBR model is to help the person lead a more or less productive life within their family and community, it is not to make a person more independent. The goal of rehabilitation is the integration of a person into his social and family circle" (Horton, 1988, p. 256).

In New Zealand, Whanau workers are employed by the Royal New Zealand Foundation for the Blind to provide services to those who identify themselves as Maori (Thomas, La Grow & Leung, 1994). Whanau is a Maori word for extended family or community. Whanau workers must be knowledgeable of Maori language, customs and traditions, as well as, their own family history and lineage. These are keys to building rapport among Maori.

Blind or visually impaired persons are often accorded a special place within the family and are treated with aroha. Aroha is a Maori word with no direct correspondence in English. It implies that the person receives love, support, pity, unity, honor, and strength all in one. The general practice is to do as much as possible for a blind family member out of respect for his or her unique place in the family. Thus, the goal of the service provided by the whanau worker is to empower the individual to live effectively as part of the whanau while enabling the whanau to extend the traditional protective framework of the family to the individual without assigning that individual to the role of invalid (Durie, 1990; Tibble, 1990). Thus, a plan of interdependence is developed. Because such a plan cannot be carried out by providing services to the individual exclusively, the recipients of the service include the individual, the individual's immediate family, and other members of the community that make up the whanau.

The acceptance of such models, like those that have been more traditionally followed in the west, is dependent upon the degree to which the values underlying the models correspond to those of the population served. The same is true for the components of the system. Thus, the goals for providing O&M service and the manner in which it is provided must be evaluated in terms of the values and beliefs of the people for whom the service is meant rather than by standards of best practice developed in another context or another era. Therefore, it is impor-

tant for us to recognize the cultural values which underlie our understanding of how rehabilitation services in general and O&M instruction specifically is to be delivered before we can fully appreciate how such values may or may not be reflected in the cultures of those we seek to serve. It is through this understanding that we may be able to separate the essential elements of the services we provide to those who are blind and visually impaired from those we believe to be essential based on our training and/or cultural heritage.

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A footnote: It is important to recognize that the Maori, whom I have used as an example throughout this paper are not a quaint, rural and backward people living in an era long past. Rather, they and their culture are a vibrant part of present day New Zealand. Maori are represented in all walks of life. Their tribal units run and manage large fisheries, forestry tracts and sheep and cattle stations. They provide educational, health and social services to their people and participate in national, regional and local government. Their culture has influenced pakeha culture resulting in a national culture which is unique in it self.

O&M SERVICES FOR ALL INDIVIDUALS WITH FUNCTIONAL MOBILITY LIMITATIONS

BRUCE B. BLASCH, CHAIR
LYDIA PETERSON
DENNIS CORY
WILLIAM WIENER
ALAN BROOKS

Independence in mobility involves a number of skills including those required for ambulation or movement, environmental negotiation and effective social interaction. Deficiency in any of these aspects of independent travel may result in a functional mobility limitation.

Any number of conditions may affect mobility. Visual impairment and blindness are the most obvious of these conditions and the most systematic and comprehensive programs of mobility instruction have been developed for this disability. Other conditions are less obvious and often have more subtle effects on one's ability to travel. A hearing impairment, for example, would not necessarily restrict one's ability to get about in an environment. Yet, like a visual impairment, it results in a reduction in the amount and range of information available to the traveler. Those with significant hearing impairments may not benefit from auditory signals, warnings, and environmental or route descriptors, nor may they rely upon public address announcements concerning the arrival, departure, location, destination, or upcoming stop when using public transportation. Most significantly, however, they may have difficulty interacting with others throughout every stage of the travel process.

The person with mental retardation may, like the hearing impaired person, experience communication problems and, like the congenitally blind person, lack certain basic concepts about the environment. He is likely to be unable to understand the general layout of the environment sufficiently to solve orientation problems and to take alternative routes. He may be stigmatized by certain visible aspects of his disability or by inappropriate behaviors in public. Many mentally retarded persons also have basic posture and gait deficiencies and lack basic skills such as in money exchanges and safety procedures in negotiating street crossings. All of these difficulties can create interaction problems for the person and cause his family to strongly resist his traveling alone.

Individuals with certain learning disabilities also may have travel problems. Some are unable to sort out the complex stimuli of the urban environment and become disoriented, particularly if they are away from a frequently traveled route. They may be unable to read street signs and the names of stores or businesses and therefore have to develop other strategies to main-

tain orientation and locate objectives. Some persons with learning disabilities are unable to use the numbering systems in large buildings and thus have orientation difficulties.

Therefore, functional mobility limitations can arise for a number of reasons. One cannot predict the difficulties an individual may face with travel by simply identifying a disorder or diagnostic category.

Intervention may involve a number of strategies carried out on both a personal and societal level. These strategies include the modification of environments, advocating for the rights of the traveler, education of the public and the provision of formalized and comprehensive mobility training to individuals with functional limitations. The first two aim to reduce the demands of the physical environment on the traveler. The third seeks to remove undue constraints imposed by the social environment, and the last is designed to enable the individual to circumvent those that remain.

The strategies involved in the instruction of persons with functional mobility limitations are essentially the same as those used with persons who are visually impaired. The program is individualized to account for the traveler's personal abilities and to meet their specific needs (which may be even more varied than those presented by the visually impaired population, if this is possible) and provide this instruction on a one-to-one basis.

Less emphasis, however, is placed on teaching the basics in the use of travel aids (if a travel aid is necessary), since this is the responsibility of others (i.e., occupational and physical therapist) and is usually done before mobility in the outdoor or natural environment begins. On the other hand, more emphasis is placed on working and cooperating with other professionals. Less emphasis may be placed on sensory training and more on the development of routes and recovery techniques for those with cognitive impairments and route planning to circumvent physical barriers for others. Similar attention is given to the use of public transportation and interaction with the public.

There are several key factors to the intervention component in mobility that have proven extremely effective. One critical factor is providing Individualized Instruction. Another critical instructional component is that instruction can be adequately provided only in natural environments similar to those in which the student will travel later. Since mobility instruction has concentrated on teaching in the real environment, the mobility specialist has developed a unique knowledge and expertise in teaching environmental problem solving. Another important teaching component in mobility training is the need for lessons of graduated difficulty and responsibility. Another common factor that has emerged in mobility training of the visually impaired is the synthesis of skills. The synthesis of skills may be viewed as the whole of independent travel is greater than the sum of its parts. Finally, one of the most important elements of mobility training is the designation of mobility instruction as the primary responsibility of one or more full-time staff members of an agency or program.

This concept of mobility instruction for disabled individuals has been implemented for many years by graduates from the mobility program that was at the University of Wisconsin, in

Madison, Wisconsin. One of these graduates, Lydia Peterson provides information about the implementation and status of a mobility program for individuals with a disability. Mr. Dennis Cory from Hamburg Germany has considered the expansion of mobility services in Germany. He provides a perspective of introducing this concept of mobility. William Wiener has made some significant progress in this area of mobility in the United States and the following paper represents his efforts.

Report by William R. Wiener, Ph.D.

The ability to travel independently is the key to independence. It allows the individual to participate in educational programs, to gain access to employment, to become a contributing member of the community, and to lead a productive life. Since the passage of the Americans with Disabilities Act, people with disabilities have been granted the right to equal access to transportation. This has led to the need for instructors who can teach orientation, independent travel, and the use of public transportation.

During the past year the Department of Blind Rehabilitation at Western Michigan University (WMU) has taken various steps to study and promote the profession of Travel Instruction for Persons with Disabilities other than blindness. WMU has received funding for two projects designed to establish travel instruction programs in the United States. These projects have been funded by Project ACTION of the National Easter Seal Society and by the Rehabilitation Services Administration of the United States Department of Education.

Project Action

Under Project Action WMU has been granted funding to develop standards for the preparation of independent travel specialists for people with various disabilities, and to develop a national examination that will lead to certification of those instructors. Standards and certification will be developed with assistance from the Federal Transit Act, as amended, through a Cooperative Agreement with the United States Department of Transportation, the Federal Transit Administration, and Project ACTION of the National Easter Seal Society.

The steering committee for this project consists of organizations concerned with independent mobility. Representatives on the steering committee include the Association for Retarded Citizens of the US, the Eastern Paralyzed Veterans Association, the United Cerebral Palsy Association, the Association for Education and Rehabilitation of the Blind and Visually Impaired, the New York City Transit Authority, the Mt. Sinai Center on Traumatic Brain Injury, the Irwin Siegel Insurance Company, the American Foundation for the Blind, the Department of Veterans Affairs, the NY Consortium for the Study of Disabilities, the President's Commission on Mental Retardation, consumers of service, and various service providers.

Since the early 1960s, various facilities serving adults and children have provided independent travel instruction (also known as travel training) for individuals with disabilities. Independent travel instruction is a comprehensive training program designed to teach persons with disabilities how to establish and maintain orientation in their environment as they travel safely and effectively from their current location to a known destination. It includes travel in indoor areas, residential neighborhoods, rural areas, business areas, and downtown areas.

While some individuals require instruction only for specific routes, others learn to develop cognitive or mental maps of street patterns and are taught to travel widely throughout the environment. An important objective of independent travel instruction is to learn to use public transportation. The building blocks of independent travel include body concepts, object and environmental concepts, spatial concepts, cognitive mapping, spatial updating, memorization, public interaction, problem-solving, and decision making. The traveler must organize for a trip, select a route, travel through the environment by utilizing landmarks and points of information, locate and board the appropriate public transportation vehicle, interact with the driver and the public, exit the vehicle at the correct stop, and continue until a destination is reached. At times, unexpected events occur that challenge the individual to seek solutions and sometimes alter the route. The term "travel training" has been used commonly to refer to instruction that prepares individuals with various disabilities (except blindness and visual impairment) to travel independently. In the United States, individuals who are blind or have a visual impairment receive independent travel instruction from orientation and mobility specialists who are graduates of special college or university Baccalaureate and Masters degree programs, and hold certification from the Association for Education and Rehabilitation of the Blind (AER). The blindness system has developed a sophisticated framework for preparation of instructors that includes 18 universities that comply with standards generated by AER. With the exception of a four year program at the University of Wisconsin (1977-81) the preparation of instructors for people with disabilities other than blindness has occurred through in-service training. Various programs around the country have prepared their own instructors and have utilized those instructors to provide travel training. Many of these programs do an excellent job of preparing instructors and of teaching students with disabilities to travel. Others, however, have not been able to invest the resources necessary to develop the comprehensive training that is required to produce qualified instructors and effective travel training programs. Therefore, travel training has been inconsistent nationally, and in many areas is not unavailable.

The purpose of the WMU Project Action Grant is to develop standards and a model curriculum that can launch the preparation of instructors of independent travel at the college level. In the first year of the project, staff identified the competencies necessary for effective practice by conducting a task analysis of practitioners who currently teach independent travel to individuals who have various disabilities. This was accomplished by visiting five locations where effective instruction is provided and carefully documenting the tasks that are taught and the competencies that are required of instructors. A validation study was then conducted to establish the importance of each competency and to assist with the establishment of curricular standards. A report of this validation study will soon be available. The second year of the project will focus on the development of certification. This will include the development of a certification examination and a certification process. In addition the project will work to facilitate the development of grant opportunities for college personnel preparation in independent .

Rehabilitation Services Administration Grant

Individuals with disabilities (other than blindness) most often in need of independent travel instruction include people who are mentally retarded, have cerebral palsy, epilepsy, autism, traumatic brain injury, and who may use wheel chairs, and ambulatory aids such as canes and walkers. There currently does not exist a program like the University of Wisconsin program to

prepare professional instructors to provide travel training in the community for people with various disabilities. Occupational and Physical Therapists teach the use of ambulatory devices in the hospital, clinic, and home but do not teach people to move through the community. Therefore, various facilities that specialize in helping individuals integrate into the community such as Centers for Developmental Disability and Centers for Independent Living are forced to train their own instructors to provide these services. In-service training is time consuming and drains resources of the agency. It often results in shortages of practitioners, staff turnover, and sometimes ill prepared instructors. For all of these reasons WMU applied for and received funding from the Rehabilitation Services Administration to develop a personnel preparation program in Travel Instruction. It is the purpose of this grant to establish a baccalaureate level curriculum in teaching independent travel to persons with a variety of disabilities, to train 10 students each year for five years, and to evaluate the effectiveness of the program and the graduates. Students graduating from this program will be able to provide the independent travel needs for persons with disabilities, and teach the skills that will enable them to become integrated into the workforce.

The previously reported Project Action Grant has allowed the Department to visit the best travel training programs in the country and conduct a task analysis of instructors who teach independent travel. The information gained from this analysis has led to the categorizing of necessary competencies and the development of a model curriculum. The Department will now take these competencies and establish a model personnel preparation program. The US. Department of Education has allocated funds to provide stipends and tuition assistance for students and to hire part-time faculty members devoted to this program. The program will train students who are upperclassmen and who have completed prerequisites for the Allied Health Professions. They will be provided with an additional 42 credit hours that will lead to a Bachelor's Degree in Travel Instruction.

Orientation and Mobility for people who are blind and Travel Instruction for people with other disabilities will exist as separate professions. Some instructors however will undoubtedly take the time to learn the theories and techniques needed to function in both professions. It is hoped that future funding will allow WMU and our other 17 universities in the US to offer programs that will bring back O&M Specialists during the summer and provide them with the additional competencies necessary to teach people with other disabilities.

Finally, Mr. Alan Brooks from the United Kingdom provides a response to the feasibility of implementing mobility training for persons with functional mobility limitations. In conclusion, Orientation and mobility programs were originally designed to meet the needs of adventitiously blinded veterans during and immediately following World War II. Numerous modifications have been made since then to make orientation and mobility instruction more appropriate for persons of diverse age, needs and ability (e.g., the very young, the very old, those with low vision and the multiply impaired). It seems compelling that the profession of orientation and mobility continue to expand to include all persons with functional mobility limitations and emerge in the future as the profession responsible to provide services to learners with other mobility limitations.

O&M FROM A TO Z
AN ALPHABET PRESENTATION OF O&M TEACHING IDEAS FOR STUDENTS FROM PRESCHOOL TO HIGH SCHOOL

JUDY HOLMES
8662 N. Servite Drive
Milwaukee, WI 53223
PEGGY MADERA
5110 W. Wolfe
Oak Lawn, IL 60453

THE JOYS OF TEACHING O&M

There is nothing more rewarding than seeing students motivated, eager to travel and show off their Orientation and Mobility (O&M) skills.

Our O&M students, from preschoolers to high schoolers, from dependent to independent - no matter what their ability - have a right to be provided with travel experiences that are meaningful and that enable them to interact with their world. They need to have numerous opportunities to be part of a travel adventure. They need to develop memories of experiences on which to build future journeys.

The teaching of Orientation and Mobility skills to students can be a fun and interesting journey. Creatively planned lessons that include adventures, songs, games, portfolios or journals, celebrations, and other exciting opportunities makes learning meaningful for students, and for their O&M Specialists as well!

A WALK THROUGH THE ALPHABET

Join us for a walk down the O&M Alphabet. Along the way, encounter some fun and motivating teaching ideas that encourage active learning. Use the ideas as a plan or road map to help your O&M students reach the next destination of skills, or to motivate them to travel to new and unfamiliar lands, or simply to participate on the journey.

ADVENTURES: O&M Adventures are an attempt to combine all of a student's O&M skills together with a touch of challenge, suspense, and just plain fun. They are age appropriate opportunities to whet the travel appetites of budding world travelers. Whether students are inspired to solve a mystery, make a rescue, find a missing person or object, unearth a treasure, or track down a spy, they will always remember the fun they had on the adventure and they will achieve a real sense of accomplishment.

Adventures can center around a specific theme or take on a plot of its own. Informational clues that students seek on an O&M Adventure can be created and shared in thousands of ways. The clues can be hidden or strategically placed to encourage the use of positional concepts and search patterns, or in plain view at various heights or on different backgrounds to encourage scanning and use of vision and appropriate exploring with the use of hands. Each adven-

ture is tailored to enable students to be active participants and decision makers. Remember to have appropriate gear and supplies available, such as spy glasses, distance viewing devices, money, maps, suitable costumes and props, identification cards, weather gear, etc. Here is one example of an O&M Adventure:

> **MISSION:POSSIBLE**
> This space age treasure hunt with a series of progressive hints leads students to an alien space creature named O2M2 (a decorated trash can). A tape recording states the purpose of the mission, a la Mission: Impossible (an American TV spy series). Students use all of their O&M skills to piece a puzzle together and successfully solve the case. Mission: Possible takes place in indoor and outdoor environments and incorporates skill building in seeking out assistance, following directions, crossing streets in residential areas, and making decisions. The adventure also includes the use of positional concepts, distance viewing devices, and cardinal directions, and integrates gross motor activities, such as searching in a variety of playground space vehicles before finding O2M2's spaceship.

GAMES: Many ready-made games that reinforce important concepts and safety rules are available in Teacher Education stores and in many educational catalogs. Be on the lookout for games that can be easily adapted and made accessible. Traffic Sign Bingo, Twister, Locomotion Memory, Location Lotto, What's That Sound Bingo, are only a few of the O&M Specialist's choices. Television game shows, such as Jeopardy, can be adapted to include questions or answers specifically related to O&M. Using categories such as, "Body Concepts", "Watch Out For Traffic", or "The Cane", will teach new information in a fun and motivating way. Ask students to create their own O&M game which will enable an O&M Specialist to observe and learn how and if a student understands important concepts.

JOURNALS: Keeping track of what we do is an invaluable way to record and reinforce what we learn. The same is true for our students. Lessons and adventures can be recorded in a multitude of ways and will provide students with an additional way to remember an important piece of information. O&M students will enjoy sharing their experiences over and over with family and friends. Taking pictures for photo books, making videos, tape recording accounts of the lesson, and creating newspapers provide family and friends with the latest O&M "news". Keeping an O&M notebook with lots of pocket folders for preserving treasures found along the way (bus schedules, brochures, maps, quizzes, etc.), developing a student portfolio to include compilation of a student's O&M work, authoring a book where your student becomes the main character, or encouraging your student to write autobiographical sketches after a lesson, are only a few ideas of ways to highlight the importance of O&M lessons. It is also a wonderful way to provide additional communication with a student's family. All of these ideas become proud keepsakes and make O&M an important part of their lives.

POSTER CONTEST: Have an O&M Poster Contest among other O&M students in school or in a state or region. Ask students to design a poster which best shares a specific theme, such as, "What O&M Mean to Me" or "My Favorite O&M Lesson". Age groupings may include elementary, middle school, and high school levels, with categories for drawn posters and tactual

posters, or print readers and braille readers. All kinds of materials can be used in making the poster. Sponsor the poster contest at a conference so that all the conference participants can vote on their favorite poster. What a great way to involve folks outside of O&M and share with them what O&M is all about for our students. Possible prizes may include ribbons, certificates, money, coupons, etc. Winning designs may be put on Tshirts, notepads, or notebooks.

SONGS: It is true that music is a universal language, and music is also an important tool of learning for our students. Create O&M songs by creating new words to familiar tunes or by compose a brand new song. One popular example is:

CANE SONG
(sung to tune of Do Re Mi from the Sound of Music)

CANE - to help me get around
CAP - a small protective band
CROOK - to hang upon the hook
GRIP - is where I place my hand
SHAFT - the body of the cane
WHITE - it glimmers in the night
RED - to help alert the cars
and the TIP is what I tap!!

Madera/Holmes, 1985

WHITE CANE DAY CELEBRATIONS: Our role as O&M Specialists also includes ongoing public relations and education efforts. Involving students in the celebration of their accomplishments and challenges often occurs on White Cane Day (October 15th) each year in the United States. It is also known as Orientation and Mobility Day!

When planning celebration ideas for White Cane Day, you may want to initiate contact with local newspapers, radio and television stations in order to bring attention to the White Cane Law. Offer simulated experiences, such as "Walk a Mile in My Shoes". Involve O&M students as touring lecturers who speak to other groups of students in schools. Design O&M brochures that can be handed out. Bake white cane cookies to serve at an Open House and invite teachers, students, and administrators. The ideas are endless.

Highlight the accomplishments of your students by organizing a banquet that includes an O&M Awards or Cane Ceremony. Invite O&M students out to lunch or invite role models and mentors to visit with O&M students. Plan a travel itinerary to a new and unfamiliar place. How many ways can you think of to celebrate White Cane Day with your students?

THE JOURNEY CONTINUES

Students who are eager to learn and demonstrate their O&M skills are ones who have come to know the excitement of being able to travel in their world. O&M Specialists have an awe-

some challenge and responsibility to create the most accommodating climate for learning; one that encourages full, accessible, and active participation.

MEASUREMENT OF ORIENTATION AND MOBILITY OUTCOMES OF THE REHABILITATION OF THE VISUALLY IMPAIRED: AN INTERNATIONAL PERSPECTIVE.

CHAIR: WILLIAM R. DE L'AUNE

REHAB R&D CENTER, DECATUR, GA, USA 30033

DISCUSSANTS: RICHARD WELSH, ROLF LUND, JENS DIETRICHSON, NURIT NEUSTADT and STEVEN LA GROW

Overview of Rehabilitation Outcomes

Outcome information is essential for accountability and performance monitoring. The demand for such monitoring is evident in requirements for quality of care and program evaluations by the Joint Commission on Accreditation of Health Care Organizations (JCAHO), the Commission on Accreditation of Rehabilitation Facilities (CARF), and the National Accreditation Council for Private Agencies Serving the Blind and Visually Impaired (NAC). In the 1994 amended reauthorization (PL 103-218) of the Technology-Related Assistance for Individuals with Disabilities Act of 1988, sections 102(3)(6-8) specify that service providers who are recipients of grants must conduct annual assessments of their programs. Despite both the demands for outcome evaluation in both clinical service delivery and in assistive technology applications in rehabilitation, development and implementation of evaluatory methodologies has been very limited.

Outcome measurement and program evaluation are vital components in the provision of rehabilitation services. Frey (1984) has observed,

> All of what we do in rehabilitation depends upon our abilities to make appropriate, reliable, and valid assessment of those variables that facilitate the rehabilitation process... When properly aggregated into a well-defined and smoothly running system, [outcomes] data can also serve the broader needs of research, interagency program evaluation, and policy development.

Inpatient and outpatient rehabilitation service providers are under increasing pressure to provide evidence that their services result both in improved function and improved quality of life.

Based primarily on patient reports and clinical assessment, we know that many people who have visual impairment experience difficulty with independent functioning. Unfortunately, while there are measures for functional performance in a few specific vision rehabilitation areas (such as reading speed, accuracy and comprehension), there are no established measures for evaluating global rehabilitation outcomes in this group. A recent review of the literature and a review of instruments for measuring rehabilitation outcomes lead to the conclusion

that existing methods in other areas would not adequately measure the particular needs or abilities of people experiencing visual impairment and blindness (Guralnik, Branch, Cummings, & Curb, 1989). Outcome measures used to test older adults without significant disabilities, for example, tend to focus on Activities of Daily Living (ADL's) and Instrumental Activities of Daily Living (IADL's) (Lawton & Brody, 1969; Katz & Akpom, 1976). They fail to capture the particular needs or abilities of individuals who are blind or visually impaired.

Historically, blind rehabilitation clinicians relied upon subjective checklists and clinical assessments to document the capacity of individuals to perform various tasks. Client's perceptions of their abilities to perform tasks have seldom been measured. The instruments by and large are not grounded in any theoretical model of outcome, nor are they configured or administered in a way that allows information to be aggregated across time or across service programs.

Research on the measurement of mobility and mobility outcomes has focused primarily on observational studies aimed at creating objective and reliable measures of mobility. The skills required to perform safe and independent travel have typically been measured as two separate areas: the mental aspects, known as orientation (Hollyfield & Foulk, 1983; Risser & Guth, 1982) and the physical effort or behavioral performance of mobility travel (Armstrong, 1975; Dodds et al., 1983). Additionally, extensive work has been completed on evaluating the effectiveness of electronic travel aids for blind and visually impaired people (Armstrong, 1975; Nye, 1973; Working Group on Aids for the Visually Impaired and Blind, 1986).

Measuring Mobility Behavior at a Clinical Level

A variety of approaches have been evaluated for measuring mobility performance. Dodds et al (1983) completed a comprehensive review of prior approaches to measuring mobility and examined the shortcomings of each approach. The measures included the frequency of contacts with obstacles, measurement of stride length, analysis of location on the sidewalk, calculation of the productive walking index, which is the total time to travel a route divided by the total time taken to walk the route. Dodds emphasized that many of the measures attempted to capture behaviors that are relevant to mobility. He concluded that previous attempts to measure mobility concentrated on observed behavior changes. They stress that what often differentiates travelers is not behavioral but the level of awareness of the traveler, the amount of effort which the traveler is using while traveling independently. Preliminary studies by Geruschat & De l'Aune (1989) agree, finding that mobility researchers whose exclusive measure is the frequency of problem behaviors have not measured enough of the major constructs that are required to be independently mobile.

Direct Measures of Mobility

Typically, observable and measurable behaviors are studied. For example, we know that identifying drop offs and crossing streets are the two most common problem behaviors, and that changes in lighting conditions is the biggest environmental problem. However, the catastrophic nature of falling due to missing a drop-off or walking into traffic results in either low

frequencies of these behaviors (good travelers) or high frequencies of these behaviors (poor travelers) resulting in subjects who are not capable of completing the experimental route. This limits the ability to create a distribution of performance scores through a discontinuation of further travel in both instructional and experimental settings. Most important, these approaches do not capture the richness of independent mobility. The blind or low vision traveler is experiencing an abundance of environmental stimuli, processing this information, then quickly reacting while moving through the environment. Measures of critical events, stride length, or posture, while descriptive, are a very small part of the total picture. This is particularly true for low vision travelers, whose performance may be very similar to the fully sighted, even though they report difficulties with independent mobility (Peli, 1986).

Indirect Measures of Mobility

We know from totally blind travelers that vision is not required to be independently mobile. However, independent mobility for the totally blind traveler is more mentally taxing, requiring greater expenditures of mental energies, than independent travel for a fully-sighted person of the same general physical and mental capacity. This is the primary reason why the totally blind traveler seldom goes for a leisurely or relaxing walk. Travel with low vision is not relaxing, it requires being alert, attending to the task, and being much more aware of the surroundings when compared to walking for a fully sighted person. The amount of effort needed for independent mobility is much greater for low vision and totally blind travelers than for a fully sighted traveler.

The human factors literature has been at the forefront in developing methods to assess the effort required to perform a specific task. Much of the research from this field has applications to the study of mobility. A variety of strategies have been used to measure effort. These include the general categories of physiological measures, behavioral or physical performance measures, and measures of secondary task performance.

Physiological measures have been studied in mobility research with mixed results. The underlying assumption in physiological monitoring is that effort is correlated with an increased physiological demand that takes place in the physiological processes of the body (Armstrong, 1985; Gartner & Murphy, 1976). A variety of physiological measures have been developed for assessment of effort including GSR, EKG. EMG, eyelid and eye movement, pupil dilation, respiratory analysis, body fluid analysis, pulse rate, ECP, spectral analysis of heart rate variability and sinus arrhythmia (Aasman et al, 1987; O'Donnell & Eggemeier, 1986; Vincente, et al, 1987). Heart rate measures have been obtained during mobility (Heyes et al, 1976; Peake & Leonard, 1971; Tanaka et al, 1981; Wycherley & Niglin, 1970), with mixed results. The major limitation in mobility research has been their relative insensitivity to immediate changes and the delay in returning to baseline status.

Measuring mental effort, also known as mental workload, is a major area of study within human factors research (Yeh & Wickens, 1988; Moray, 1979; Wierwille, 1979) attracting many specialty areas (psychology, physiology, engineers) with both applied and theoretical interests (Eggemeier, 1980). Some of the most common areas of study have included mental workload

measurement in air traffic control and pilot displays (Gartner & Murphy, 1976; Wierwille, 1979), arm prostheses (Wierwille, 1979), and machine operation. This extensive body of literature has demonstrated the efficacy of this technique for evaluating the amount of reserve mental effort that remains while the subject is performing the primary task (Meshkati & Loewenthal, 1988; O'Donnel & Eggemeier, 1986).

Secondary task has also been studied in mobility research. A secondary task is a task that the subject is asked to perform in addition to his/her primary task. If the subject is able to perform well on the secondary task, one infers that the primary task is relatively easy; if the subject is unable to perform the secondary task and at the same time maintain the primary task performance, one infers that the requirements of the primary task are more demanding. The difference between the performances obtained under the two conditions (primary alone and primary/secondary) is then taken as a measure, or index, of the effort imposed by the primary task (Meshkati & Lowenthal, 1988).

Shingledecker (Shingledecker, 1983; Schingledecker & Foulke, 1978) was the first to document the applications of secondary task to the measurement of blind mobility. Using a reaction time task of brief vibratory signals on either wrist, the subject was required to press the appropriate button on a panel carried in the non-dominant hand. The findings of this research suggest that as the complexity of the route increases, speed of reaction decreases. The major limitation of this study was the selection of subjects. Three sighted, blindfolded subjects, and one totally blind, highly experienced traveler served as subjects.

Subjective Measures of Mobility

Subjective measures of performance can occur from two discrete points of view; evaluation of a specific task, such as soliciting comments following a walk along a prescribed route, and comments in response to the question of "in general".

Objective performance on a specific task does not always convey valid information about the subject's experience. For example, two subjects may travel a mobility route with identical scores on a behavioral checklist while experiencing quite different levels of difficulty. One subject may simply have to work harder to prevent a decrease in performance (Yeh & Wickens, 1988). The result is that the internal experiences of the subject cannot always be inferred from objective measures of performance. Subjective measures have been repeatedly shown to be practical, minimally intrusive, and not disruptive of task performance (Eggemeier, 1980). Additional advantages include convenience, ease of implementation, low expense, and ease of analysis (O'Donnell & Eggemeier, 1986). Hess (1973) was one of the first to study the use of rating scales in human response experiments. His results suggest that subjects can transpose impressions of a task directly to a linear numerical index.

Quality of life (i.e. mobility travel) has become an increasing concern of the medical community. For example, from the ophthalmological community The National Eye Institute sponsored and published the proceedings from a conference on **Measuring the Quality of Life of**

People with Visual Impairment. This report describes the value and importance of combining more traditional measures of visual performance such as visual acuity and contrast sensitivity function with a brief questionnaire related to performing functional tasks as a valuable strategy for evaluating medical outcomes.

Subjective measures are very important to the quality of life of the veteran yet may not correlate with measures of the primary task e.g. bumping, poor street crossing. Thus, the major disadvantages of subjective scales in response to a specific task are that experience, emotions, or abilities may affect subjective opinion. Adaptation to the task may produce ratings that are too high or too low. As the subject gains experience with the mobility task, the learning involved may cause the ratings to change. Rehmann et al (1983) point out that simultaneous assessment of performance in a subjective approach is critical to minimize this problem. No literature was found which systematically gathered information on mobility travel following travel on specific routes.

The second approach with subjective evaluations is to ask questions of a general nature. In this type of evaluation the subject is asked to generalize their response to describe their overall experience. For example, Smith, De l'Aune and Geruschat (1982) asked low vision travelers "What do you feel are the five most difficult mobility problems persons with low vision experience as they walk around by themselves? Genensky et al (1979) asked respondents to "check" items from a list of environmental characteristics (bright to dimly lit areas, finding a public restroom) that were always a problem or sometimes a problem. These authors have provided some of the most important data regarding the general problems of low vision travelers.

The participants in this session will discuss the measures and methods used in their efforts to measure general, functional mobility outcomes. These discussants are:

William De l'Aune - The Department of Veterans Affairs has undertaken a very large scale effort to develop outcome measures for Blind Rehabilitation. This effort involves the development and refinement of self report instruments for functional outcomes and programmatic satisfaction as well as the structuring of a data base of related information about the clients. Progress to date will be discussed.

Richard Welsh - In collaboration with the Department of Veterans Affairs study on outcome measures for Blind Rehabilitation, the National Accreditation Council for Private Agencies Serving the Blind and Visually Handicapped (NAC) has facilitated participation of non-DVA rehabilitation service providers. This effort will be discussed.

Rolf Lund and Jens Dietrichson - This presentation will focus on a recently funded project on rehabilitation outcomes in the field of visual impairment in Norway.

Nurit Neustadt - A battery of assessment forms was developed in Israel in the late 1980s to measure quantitative and qualitative functional rehabilitation achievements and to

provide a means for scientific data analysis. The system and the protocol will be presented and discussed.

Steve La Grow – Dr. La Grow will discuss rehabilitation outcomes measurement from the perspective of the New Zealand Services for the Visually Impaired.

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EFFECTS OF INTERSECTION DESIGN AND TRAFFIC CONTROL ON ORIENTATION AND SAFETY OF BLIND PEDESTRIANS

BILLIE LOUISE BENTZEN, USA, MODERATOR
OSAMU SHIMIZU, JAPAN
MURRAY MOUNTAIN, AUSTRALIA
JORGEN NAGEL, GERMANY
AGATHE RATELLE, CANADA
LUKAS FRANCK, USA

As traffic engineers design intersections to handle increasing vehicular traffic with minimal delay, blind pedestrians have increasing difficulty obtaining information for orientation and safety when crossing complex intersections. An international panel will present intersection problems experienced by pedestrians with visual impairments, and solutions which are being used in various countries. There will be opportunity for all participants to bring intersection problems and solutions to the attention of the workshop.

Problems will include:

- Blended curbs or curb ramps, including diagonal curb ramps;
- Signalized intersections in which it is difficult to tell when the walk phase begins, including intersections in which the onset of a pedestrian activated walk phase, cannot be reliably heard, traffic actuated intersections in which the timing of phases in the cycle is not predictable, intersections with continuous right turns, and intersections with separate left turn phases;
- Intersections in which there is insufficient time to complete a crossing;
- Intersection configurations in which the direction of the up-curb is difficult or impossible to determine by listening to traffic flow; and
- Intersections having islands or medians, which sometimes must be located in order to activate a pedestrian activated walk phase.

Solutions will include:

- Warning surfaces;
- Audible and vibrotactile pedestrian signals; and
- Pedestrian detection technology.

Billie Louise (Beezy) Bentzen
Accessible Design for the Blind
P.O. Box 1212, Berlin, MA 01503
Phone and Fax 978 838-2307
bbentzen@ma.ultranet.com

ROLES AND FUNCTIONS OF MOBILITY INSTRUCTORS WHO ATTENDED THE IMC8

DUANE R. GERUSCHAT PH.D.
U.S.A.
NURIT NEUSTADT-NOY PH.D.
Israel
DENNIS CORY, M.A.
Germany

Corresponding Address
Duane R. Geruschat
The Maryland School for the Blind
3501 Taylor Avenue
Baltimore, MD 21146

Beginning with the IMC5 and continuing through IMC6, 7, and 8, we have collected data from conference participants describing themselves, their clients, where services are provided, and the agencies in which they work. The purpose is to gather data on the roles and functions of mobility instructors who attend the various IMC's. Secondly, we are interested in comparing the roles and functions of instructors from the various regions of the world (i.e. European, African, South Pacific, U.S., etc.). From the IMC8 we have 36 countries represented.

To present our findings, we have divided the information into three categories: Descriptions of mobility instructors, places of employment, and descriptions of clients receiving mobility.

DESCRIPTION OF PARTICIPANTS

Demographic Comparisons

Category	IMC5	IMC6	IMC7	IMC8	US
Age	38	38	39	42	36
Sex	M=39% F=61%	M=58% F=41%	M=50% F=50%	M=37% F=61%	M=35% F=65%
Vision Status					
Sighted	97%	100%	97%	92%	96%
Partial	1%	0%	3%	4%	0%
Blind	1%	0%	0%	3%	0%

The average age for the participants of IMC8 is 42. The conference had a high percentage of female participants (61%) compared to male participants (37%).

Comparing IMC8 to the previous IMC's and the US survey, we found a high degree of similarity. Average ages ranged from 36 to 42. With the exception of IMC6 where male participants were clearly the minority, then IMC7 which was evenly split, the participants were majority female. The vision status of all participants is predominantly sighted in all surveys.

Our next area of comparison was professional training.

Professional Training

	IMC5	IMC6	IMC7	IMC8	US
High School	29%	28%	8%	13%	
Bachelors degree	19%	41%	32%	30%	12%
Masters degree	22%	16%	16%	27%	83%
Ph.D. or Ed.D.	9%	4%	13%	12%	5%
Diploma		27%	31%	29%	
Other	22%				

69% of IMC8 respondents have college degrees in O&M with 29% having a diploma. Comparing educational preparation across the 4 IMC, it appears the participants are becoming better educated with 41% college educated in IMC5 to 69% with college degrees by IMC8. The diploma remains a common approach to receiving an O&M credential.

PLACE OF EMPLOYMENT

	IMC5	IMC6	IMC7	IMC8	US
Schools f/t blind	46%	14%	15%	15%	46%
Rehabilitation cntrs	28%	28%	29%	21%	48%
Medical cntrs	2%	8%	3%	6%	2%
Vocation Trning cntrs	8%	7%	4%	4%	3%
Professional Prep	21%	8%	12%	15%	0%
Other	17%	46%	37%	39%	10%

Each respondent was asked to indicate the type of agency which employs them. For the IMC8, as with the other IMC's, our survey continues to find a large percentage for "other" with 39% response. Traditional rehabilitation centers and schools for the blind are the most common places of employment. Excepting IMC5 and the US study, we continue to find a large number of "other" responses for IMC 6/7. Evidently our categories do not adequately capture the places of employment for a large number of participants. Within the categories adult rehabilitation centers continue to be the most common employer followed closely by residential schools for the blind.

Where O&M services are provided is our next area of comparison. Center based programs continue to be the most common location for providing services with relatively few instructors providing service in the clients home.

Where service is provided

	IMC5	IMC6	IMC7	IMC8
Center based	56%	65%	48%	70%
Client's home	35%	48%	43%	41%
Client's work	10%	23%	8%	11%

CLIENT DESCRIPTIONS

Ages of Clients

	IMC5	IMC6	IMC7	IMC8	US
0-18	48%	31%	31%	37%	48%
19-65	36%	31%	31%	25%	36%
Over 65	15%	23%	18%	11%	15%
All ages		49%	51%	47%	

Almost half of all respondents in IMC8 work with all age groups. The second most common group is children with the elderly continuing to receive the least amount of service. Looking at all IMC's we compared caseloads for the four groups. There is a fairly even split between children and services to adults. The elderly, in spite of their being representing the largest group of clients, consistently receive the least amount of service. A large portion of the respondents appear to be serving all ages.

On the descripter, degree of visual impairment, despite the demographics which suggest that most visually impaired clients have remaining sight, there is a relatively even split between the two groups of vision loss.

Degree of Visual Impairment

	IMC5	IMC6	IMC7	IMC8	US
Totally blind	49%	53%	65%	43%	29%
P. Sighted	51%	46%	35%	53%	62%

CONCLUSIONS

The major findings of this survey suggest that:

1. 36 countries were represented in the IMC8 survey.
2. The average age for the participants of IMC8 is 42. The conference had a high percentage of female participants (61%) compared to male participants (37%).
3. 69% of IMC8 respondents have college degrees in O&M with 29% having a diploma.
4. Traditional rehabilitation centers and schools for the blind are the most common places of employment.
5. Center based programs continue to be the most common location for providing services with relatively few instructors providing service in the clients home.
6. The elderly, in spite of their being representing the largest group of clients, consistently receive the least amount of service.
7. A large portion of the respondents appear to be serving all ages.
8. Despite the demographics which suggest that most visually impaired clients have remaining sight, there is a relatively even split between the two groups of vision loss for the clients being served.

SUTERKO-CORY AWARD

The intent of this special award is to recognize an individual who has made significant contributions to the field of orientation and mobility (O&M) on an international basis. This individual may have served as an ambassador, teacher, mentor, innovator or researcher in the area of O&M and has extended themselves beyond their own country. They exhibit pride in their work, and demonstrate commitment to improve the lives of individuals with a visual impairment and to their profession which goes beyond political boundaries. The award is named after two such individuals, Stanley Suterko and Dennis Cory, who exemplify the intent of this award.

The First Recipient of the Suterko-Cory Award
Theodor Reusch
Reutlingen, Germany

PRESENTATION OF THE SUTERKO-CORY AWARD

DENNIS CORY
IRIS, Bachstrafle 30, D-22083 Hamburg

As I prepared these remarks to present Theodor Reusch with the Suterko- Cory Award I was reminded of the circumstances surrounding the creation of this award in Trondheim, Norway, in 1996. As I mentioned in my opening remarks here at IMC 9 1 had actually planned to leave the International Organizing Committee at the end of IMC 8. The other committee members decided to create this award to mark my departure and at the same time honor a true international champion for the profession of orientation and mobility, Stanley Suterko. I did not then nor do I now feel that there is justification for my name next to Stan's on this award.

Today, however, I take great pleasure in using this award to honor an O&M instructor whose work, dedication and character put him on the same level as Stanley Suterko.

Although the international experience reflected in the following list is impressive, it is only one element which causes Theo to stand out. The simple list alone does not evidence the complexity, danger and hardship often involved in conducting instructors courses in the areas of the world where Theo has worked nor does it do justice to Theo's philosophy, his religious integrity and his straight forward approach to life which predestined him to become a founding member of the International Organizing Committee for IMC.

In preparation for work with blind and low vision persons with the Christoffel Mission for the Blind Theo spent 1963 - 1967 in theological pastoral training at a private center in Switzerland. From 1967-1969 he attended the Mission Academy in Korntal, Germany in the M.A. program in affiliation with Columbia University. In 1969 and again in 1972 he participated in in-service training, first at the rehabilitation center in Liverpool and then at the rehabilitation center in Sheffield.

1975 saw Theo in the O&M Instructors' Course in National Mobility Centre in Birmingham which included an O&M internship at the Deutsche Blindenstudienanstalt in Marburg, Germany.

What then followed starting in 1976 and lasting through 1990 were O&M Instructors Courses in some very interesting parts of the world:

1976
Theo organized courses in India and was immediately confronted with the cultural, social, physical and economic differences which made modification in the standard programs essential. As he reported at IMC 1 and I quote here from the proceedings of the IMC, "The actual environmental patterns, the flow of traffic with a much higher accident rate, make many things difficult. ... All imaginable ditches, holes, uneven surfaces, the lack of concrete shorelines,

innumerable bicycles as well as the entire tohu-wa-bohu of the traffic make it difficult to set up any general rules."

"tohu-wa-bohu" may well be the term to describe the situation in Israel where Theo also worked in 1976. His resolve to further O&M regardless of politics, religion or economics was tested here.

1977 -1978
Theo returned to India for courses and follow-up.

1979
As a presenter at IMC 1 Theo reported on O&M in the Third World with the emphasis on India and then became a member of the International Organizing Committee for IMC formed in Frankfurt at IMC 1.

1979 -1981
The work was expanded to the field in Africa with courses in Kenya and Ghana. Although he couldn't attend IMC 2 because of the course to be done in Ghana at that time, Theo was instrumental with the preparation and helped negotiate travel stipends for participants from developing countries. He showed the skill in differentiating between politicians and functionaries looking for a free trip and dedicated practitioners who could transfer the experience at IMC to the work at home.

1982
Although the situation in Gaza and the West Bank remained tense, Theo continued his work there. Rumor has it that he was seen dressed in a quite Arabian style in order to visit with former students in Gaza.

1983
At IMC III in Vienna Theo opened the presentation of papers with a survey of O&M in those countries in which he had worked or was currently working. Although we always tended to minimize the topic, he kept reminding us of the importance of communication with practitioners in O&M in all parts of the world. Again due to his initiative there were stipends for participants from the Third World.

Follow up in Gaza and the West Bank was necessary but difficult and those at the scene unanimously confirm Theo's courage and common sense approach at this point.

1985 -1990
As if the past work had not been challenging enough Theo traveled to Pakistan where services for Afghani refugees received his attention and the liaison work with the National Committee in Israel for IMC IV in Jerusalem gave him additional responsibility. The working sessions with him were a pleasure at that time.

He remained hard at work for IMC V 1989 in the Netherlands by attending preparation meetings and getting the Third World workshop on the program where that workshop got some of the most positive results in the post conference evaluation.

Theo hosted the IOC in Bensheim, Germany, in 1989 for the planning of IMC 6 in Madrid.

When the ill health of his wife and the changes in his responsibilities at CBM made direct work on the committee difficult, Theo kept in contact on the preparation but was not able to attend IMC 7 in Melbourne nor IMC 8 in Trondheim.

As a member of the IMC committee Theo took on the role of keeping us attentive to the needs and rights of blind and low vision persons in developing countries. His experience in the field has given him the insight and necessary background to do this.

A quote from Theo's presentation at IMC1 reveals his understanding and dedication to pioneer work in O&M:

"I think it has become quite clear this morning that this work can only be pioneer work. My stay in underdeveloped countries has been very profitable for me personally. I was active in Afganistan earlier, have visited India several times and from these experiences I started thinking (during my training in Birmingham, England, and then in Marburg) of how we should convey what we have learned and what we have found to work well here, to countries of the Third World."

It would have been a shame for you to resign from the IMC Organizing Committee without an appropriate ceremony. I thank the initiators of the Suterko-Cory Award for giving us this opportunity.

And although it is quite true that Theo's English is much better than my German, I wish to conclude with a most sincere "Herzlichen Dank f,r Deinen Einsatz f,,r IMC" and thus express very sincere gratitude for your efforts to improve the lives of individuals with visual impairment with no regard whatsoever to political borders, for your energy and ideas invested in IMC and for the opportunity to have worked with you.

AUTHORS INDEX

IMC 9 SALUTES

50th ANNIVERSARY OF DEPARTMENT OF VETERANS AFFAIRS BLIND REHABILITATION SERVICE

On the 4th of July in 1948, the first blinded veteran was admitted to the blind rehabilitation program at Edward Hines, Jr. VA Hospital, in the suburbs of Chicago, Illinois, USA. The rehabilitation curriculum was developed, refined and expanded by Russ Williams, Richard Hoover, Warren Bledsoe and the first Orientation and Mobility staff. This was the source of the long cane techniques as we know them today as well as the profession of Orientation and Mobility.

THE BLINDED VETERANS ASSOCIATION

Founded in 1945, the BVA campaigned for the creation of the Blind Rehabilitation Center. The BVA has continued its active partnership with the VA programs in clinical rehabilitation and rehabilitation research in advocating for the highest quality services, technology and information for individuals with a visual impairment.

Congratulations IMC9

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Amy Lutz, B.A.
Cathy Coon

Rehabilitation Research & Development Center
United States Department of Veterans Affairs
Atlanta VA Medical Center
1670 Clairmont Road (151R)
Decatur, Georgia 30033
phone: 404/321-6111
fax: 404/728-4837